

# The role of health beliefs in breast self-examination behavior in female health workers in Guilan Province

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## ABSTRACT

**Introduction:** Breast cancer is the most common cancer in women in Iran and the world, and it is the second leading cause of death from cancer in women, which can be cured if diagnosed early. Monthly breast self-examination (BSE) can increase women's awareness of their natural breast condition and screening tests. The purpose of this study was to determine the predictive power of the health belief model (HBM) in performing BSE female health workers of Guilan province. **Materials and Methods:** In this cross-sectional analytical study, 496 female health workers were selected randomly in Guilan province in 2018. The tool used was self-administered questionnaire included demographic characteristics, knowledge, behavior, and HBM constructs (Champion, National Standardized Questionnaire). Data were analyzed using the SPSS software (version 21) based on Spearman correlation test and multiple logistic regression. **Results:** The mean age of female health workers was  $40.8 \pm 7.7$  years. Only 10.5% of female were done the BSEs (with knowledge of procedure and at the right time) in a desirable way. In the logistic regression analysis, knowledge, perceived barriers, and health motivation were predictive of desirable BSE behavior. **Conclusion:** The desirable BSE of female health workers in Guilan province was very low, while this group could have a significant effect on women's health behaviors in rural communities as role model. Planning and implementation of educational interventions based on knowledge and predictive constructs of desirable behavior are recommended.

**KEY WORDS:** Breast self-examination, Health motivation, Knowledge, Perceived barriers

## INTRODUCTION

Cancer is the second leading cause of death after cardiovascular disease in the world<sup>[1]</sup> and the third cause of death in Iran.<sup>[2,3]</sup> Meanwhile, breast cancer is the most common cancer among women in developed and developing countries. It is also the second leading cause of women's death in the world.<sup>[1,4,5]</sup> The incidence rate of various cancers in Iran, in 2012, shows that the highest incidence among cancers is related to breast cancer (11.5%) and its increase will be 34% by 2025.<sup>[6]</sup> An increase in the incidence rate per 100,000 people in Iran during the studied years (between 2003 and 2009) from 16 to 28.3 and the

mortality rate (between 1995 and 2010) from 0.96 to 4.33 have been indicated.<sup>[7]</sup>

Women of all ages are at risk for breast cancer and the mentioned risk increases with age,<sup>[8]</sup> but the age of engagement with breast cancer among Iranian women is 10 years less than their counterparts in Western countries. The most common affliction age in Iran is 45–54 years.<sup>[9,10]</sup>

Although breast cancer cannot be prevented, life expectancy in >90% of people with this cancer will be high with early detection.<sup>[11]</sup> One of the best ways for early detection is screening. Based on the recommendation of the World Health Organization, screening can significantly reduce mortality in breast cancer.<sup>[12]</sup>

Early diagnostic methods and breast cancer screening include monthly breast self-examination (BSE),

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clinical breast examination by physician and midwife, mammography, sonography and magnetic resonance imaging.<sup>[13]</sup> In case of self-examination and clinical examination of the breast as well as mammography, the development of many cases of the breast cancer to more advanced stages can be prevented.<sup>[14]</sup> The remarkable point is that BSE increases the knowledge of breast health and increases the chance of detecting breast cancer early in life. In addition, the majority of breast cancers are identified by women themselves (48%) and by breast imaging in the next stage (41%). Physical examination by the doctor only detects breast cancer in 11% of cases. Therefore, although the incidence rate of breast cancer is low in young women, early education of BSE is important to make it as habit. Organizations such as the American Cancer Society are founder and holder of some courses for BSE. There is a significant relationship between breast self-examination and mammography.<sup>[15]</sup> BSE in women from the age of 20 increases the awareness about abnormal symptoms of breast and its risk factors. This concept is known as breast awareness which can play a major role in reducing death in many countries. Low awareness of breast cancer is one of the factors which reduces the effective use of screening tests.<sup>[16]</sup> BSE as an accessible, simple, cost-free, fast, non-invasive, and harmless way is considered for early detection of tumors of the breast cancer.<sup>[16,17]</sup>

Since the most common reason for not having a self-examination or clinical examination of the breast, along with a lack of awareness, is the belief that BSE is unnecessary,<sup>[18]</sup> and due to the complex and real relationship between attitudes, beliefs, and health behaviors, models of health education and promotion are used to change behavior in people.<sup>[19]</sup>

Based on the results of various studies, one of the most appropriate models for training is health belief model (HBM). Some studies have confirmed the effectiveness of this model in promoting BSE behavior.<sup>[20-24]</sup> “This model contains six main constructs: Perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action. These were defined as perceived susceptibility: Subjective belief that a person may acquire a disease or enter a harmful state as a result of a particular behavior. Perceived severity: Belief in the extent of harm that can result from the acquired disease or harmful state as a result of a particular behavior. Perceived benefits: Belief in the advantages of the methods suggested for reducing the risk of seriousness of the disease or harmful state resulting from a particular behavior. Perceived barriers: Belief concerning actual and imagined costs of performing the suggested behavior. Self-efficacy: Confidence in one’s ability to acquire a new behavior. Cues to action: Precipitating force that makes a person feels the need to take action.”<sup>[25]</sup>

Furthermore, beliefs related to the status of the interest and concern about health (health motivation)<sup>[26]</sup> can ultimately lead performance of risk prevention.<sup>[25]</sup> Based on the studies in which the positive relationship between the health motivation construct and BSE behavior was proven, above construct was added the HBM by Champion to investigate such behavior.<sup>[26]</sup> In other reviews, developed model of health belief has been also used.<sup>[18,24,27-30]</sup>

The health community and especially health workers provide first and the most important level of prevention services to the Iranian community, especially the most deprived people. In addition to having crucial role in educating women, health workers can have a great impact on women’s follow-up with them due to their hygienic behaviors as role models.

The purpose of this study was to determine the predictive power of HBM in BSE behavior of women’s health workers in Guilan Province in 2018. It was designed for use in planning and implementing educational interventions in the mentioned group of women.

## MATERIALS AND METHODS

This cross-sectional study is descriptive analytical which was carried out on 496 female health workers in Guilan Province who were randomly selected.

In a multistage sampling, first, of 16 cities of Guilan Province, eight cities (Shaft, Lahijan, Some’e Sara, Astaneh, Rudbar, Rasht, Talesh, and Rezvanshahr) randomly selected in different geographical areas, then, in each city, the employed health workers, proportional to the number of female health workers in each city, convenience sampling was done.

The sample size was calculated based on the formula for estimating a ratio. In the study of Karimy *et al.*<sup>[31]</sup> was reported the proportion of BSE behavior to be 19%. Based on this and considering  $\alpha = 0.05$  and estimated error of 3%, considering the loss of information in 20% of the samples, the sample size was estimated to be 496 people.

The inclusion criteria for entering the study included complete satisfaction of participants for study, age of over 20 years, no history of breast or other cancers, lack of breastfeeding, or pregnancy. By referring the researcher to the school of health workers training in each city or the venue for retraining programs of health workers (at predetermined dates), questionnaires were completed and collected after providing explanations regarding the study objectives and the confidentiality of the information as well as obtaining informed consent from individuals.

To collect information, a valid and reliable and self-administered questionnaire was used which included four parts: Demographic characteristics (16 items), behavior (two items), knowledge (26 items), and HBM constructs (44 items).

Assessment of behavior was designed in the form of a question related to doing BSE behavior in a past year in the form of “yes” or “no” question and another question related to the description of the intervals of doing behavior in five options. Evaluation of knowledge about breast cancer (including risk factors, clinical symptoms, and proper timing of BSE) was performed based on a researcher made and multiple choice questionnaire by Rigi *et al.*<sup>[23]</sup>

For scoring the questions related to knowledge, 2 points were considered for the correct answers, 0 point was given to the wrong answers, and “I do not know” answers were considered score 1 (minimum 0 and maximum 52 scores). The standard questionnaire was also used for constructs of HBM by Champion.<sup>[26]</sup> To assess the validity of the content of behavior-oriented and knowledge questions, a panel of experts in health education (five individuals), midwifery (two persons), epidemiology (one person), and vital statistics (one person) were used. After the final correction, the content validity ratio and content validity index indices were obtained above 90% in average for each of the questions. To assess the reliability of behavior-oriented questions and knowledge questionnaire, the test-retest method was used so that the questionnaire was completed by 15 health workers, 2 times with two visits within a week.

Agreement ratio of people’s responses for questions 1 and 2 related to behavior was 0.87 and 0.89, respectively. Regarding the question of the frequency of BSE behavior during the past year, the intraclass correlation coefficient (ICC) was obtained 0.818. Furthermore, ICC for awareness score of health workers was obtained 0.943 which indicated high reliability of the questions.

Standard questionnaire of Champion<sup>[26]</sup> was localized in Iran by Taymoori and its validity and reliability were obtained.

In the mentioned study, the reliability of the questionnaire based on Cronbach’s alpha coefficient was reported as the following: 0.82 for perceived susceptibility construct, 0.84 for perceived severity construct, 0.80 for construct of perceived benefits, 0.86 for the perceived barriers construct, 0.90 for perceived self-efficacy construct, and 0.77 for health motivation.<sup>[18]</sup> This tool has also been used in other previous studies.<sup>[23,32]</sup>

The Champion standard questionnaire consists of 44 questions for measuring the HBM. The evaluation

of the constructs is based on the five-option Likert scale (1 for I fully agree up to 5 for I totally agree) and includes perceived susceptibility construct (three questions) with minimum and maximum achievable score of 3–15, the perceived severity construct (seven questions) with a minimum and maximum achievable score of 7–35, the perceived benefits construct (six questions) with a minimum and maximum achievable score between 6 and 30, perceived barriers construct (10 questions) with a minimum and maximum achievable score between 10 and 50, perceived self-efficacy construct (11 questions) with minimum and maximum acquired score between 11 and 55, and finally, the health motivation construct (seven questions) with a minimum and maximum achievable score of 7–35.

In this questionnaire, higher scores represent greater perceived susceptibility and severity of breast cancer as well as greater rate of perceived benefits and barriers to BSE, self-efficacy, and higher motivation for BSE. The question of cues to action consists of 11 items and the person chooses yes or no according to their intended points. Data were analyzed using the SPSS software (version 21). To describe the data, descriptive indexes of frequency (percentage) and mean (standard deviation) were used.

Normality of the distribution of quantitative variables was evaluated using Q-Q chart and coefficient of skewness and kurtosis. Linear correlation among constructs of HBM was reported by doing BSE using Spearman correlation coefficient. To assess the relationship between performing BSE behavior and awareness score, each construct of HBM as well as demographic qualitative and quantitative variables, and one-dimensional logistic regression analysis was implemented. To examine the predictive behavior of breast self-examination behavior by constructs of HBM by controlling the effect of potential confounders, backward multiple logistic regression was used. The significance level was considered 0.05.

## RESULTS

The mean age of the studied health workers was 40.78 years (from 20 to 58 years). Most of them were married (92.3%) and they had diploma education (77.6%). In terms of the history of breast cancer, 14.4% reported breast cancer in their families including the first and second degree relatives or friends. Other demographic characteristics are presented in Table 1.

The frequency of BSE during the past year has been reported by health workers in Table 2.

The data display that despite monthly and regular BSE in 173 health workers (34.9%), only 52 cases (10.5%) were aware of the correct time of BSE and have stated

**Table 1: Description of the demographic characteristics of the participants**

Characteristics	n (%)
Marital status	
Single	21 (4.3)
Married	454 (92.3)
Widowed/divorced	17 (3.4)
Child number	
0	36 (7.5)
1–2	388 (80.4)
3–5	58 (12.1)
Education (years)	
<12	47 (9.5)
12	385 (77.6)
>12	64 (12.9)
Spouse education (years)	
≤12	127 (28.9)
14	178 (39.6)
>16	145 (32.2)
Living location	
Urban	277 (60.6)
Rural	180 (39.4)
History of breast problem	
No	416 (83.9)
Itself	39 (7.8)
Family/relatives	41 (8.3)
Family history of breast cancer	
No	381 (76.8)
Near relatives	15 (3.0)
(mother/sister/daughter)	
Far relatives	37 (7.5)
Others	12 (2.4)
Not response	51 (10.3)
Age, year*	40.78±7.68 (20–58)
Menarche age, year*	13.07±1.56 (9–27)
Work experience, year*	19.77±7.81 (3–41)

\*Mean±standard (range) deviation is reported

**Table 2: Description of the frequency of BSE over the past year stated by the participants**

Frequency of BSE during the past year	n (%)
Never performed	112 (22.6)
Only once	80 (16.1)
5–6 months	41 (8.3)
3–4 months	43 (8.7)
2 months	46 (9.3)
Performed monthly regularly*	173 (34.9)

\*Only 52 cases (10.5%) were aware of the procedure of BSE at the right time and ideally did it. BSE: Breast self-examination

that they know the proper way to perform BSE. In other words, only 10.5% of them performed optimal BSE.

Description of knowledge and HBM in the studied population is shown in Table 3. The studied health care workers gained high score in health motivation, perceived benefits, and self-efficacy. However, the score of their perceived barriers was low. On the other hand, the perceived susceptibility and severity of the health workers were also low.

Based on investigation of the relationship between the demographic characteristics of the studied health workers and the desirable performance of BSE, it was shown that none of the demographic characteristics

had significant relationship with a desired self-test behavior (for all cases,  $P > 0.05$ ).

According to Table 4, examination of linear correlation between knowledge score and each of the constructs of HBM as well as conducting favorable BSE indicates that there is a weak direct linear correlation between knowledge as well as health motivation and performing desirable behavior while there is a poor reverse linear correlation between perceived barriers and desirable behavior.

Investigating the relationship between knowledge well as HBM and optimal BSE behavior in multiple logistic regression analysis indicated that optimal BSE behavior was predicted by the variable of knowledge constructs of perceived barriers and health motivation [Table 5].

In terms of knowledge, the data displayed that, in general, the greatest knowledge of health workers was in relation to clinical symptoms and their lowest rate of knowledge was related to identifying breast cancer risk factors.

On the other hand, the most relevant questions about knowledge by performing BSE behavior included knowledge about the proper time to perform BSE ( $r = 0.509$ ), the proper age for performing mammography ( $r = 0.124$ ), the possible effect of menopausal age above 50 years on breast cancer ( $r = 0.113$ ), and clinical signs such as color change wounds or skin lesions of the breast in the detection of breast cancer ( $r = 1.03$ ), respectively.

Regarding the most important barriers in doing optimal BSE, the items consisting of “performing a monthly BSE makes me concerned about the incidence of breast cancer” ( $r = -0.137$ ), “I feel I cannot perform BSE correctly” ( $r = -0.130$ ), and “It is difficult for me to remember the timing of BSE” ( $r = -0.114$ ) the most relevant items to the lack of favorable BSE behavior.

Furthermore, from health motivation construct, the items including “I exercise at least 3 times a week” ( $r = 0.128$ ), “I want to quickly find my health problems” ( $r = 0.124$ ), and “Even if I’m not patient, I will check my health status regularly” ( $r = 0.117$ ) are the most relevant ones to doing the optimal BSE behavior.

The most important cues to action that have led to gaining information about the prevention of breast cancer in health workers are as follows:

Doctors and other health care staff (72%), books (50%), educational publications (48%), television (38%), internet (36%), and social networks (24%).

In accordance with this, the most important priorities of health workers to acquire information consisted of

**Table 3: Description of knowledge and HBM related to BSE practice in the participants**

Variables (questions)	Cronbach's alpha	Median	Mean±SD	Range	Item mean	Item SD
Knowledge - 26	0.82	43	41.25 7.31	October - 52	-	-
Perceived susceptibility - 3	0.85	8	7.8 2.79	March - 15	2.6	0.93
Perceived severity - 7	0.86	21	20.47 6.43	July - 35	2.92	0.93
Perceived benefits - 6	0.82	24	24.15 4.16	June - 30	4.02	0.69
Perceived barriers - 10	0.87	20.5	21.6 6.88	October - 50	2.16	0.69
Self-efficacy - 11	0.92	43	42.4 7.87	November - 55	3.85	0.72
Health motivation - 7	0.86	29	28.93 4.7	July - 35	4.13	0.67

BSE: Breast self-examination

**Table 4: Correlation between performing optimal BSE and knowledge and constructs of HBM in the participants**

Variables	Optimal BSE	1	2	3	4	5	6	7
1. Knowledge	0.122**	1						
2. Perceived susceptibility	-0.01	0/017	1					
3. Perceived severity	-0.047	0.035	0.500**	1				
4. Perceived benefits	0.079	0.092*	0.197**	0.242**	1			
5. Perceived barriers	-0.158**	-0.041	0.265**	0.324**	-0.113*	1		
6. Self-efficacy	0.077	0.001	-0.03	0.008	0.398*	-0.277**	1	
7. Health motivation	0.126**	-0.014	-0.044	0.003	0.277**	-0.218	0.463**	1

\*Represents  $P < 0.05$  and \*\*represents  $P < 0.01$ . BSE: Breast self-examination

**Table 5: Odds ratio and 95% confidence interval of BSE based on knowledge and HBM constructs from multiple logistic regression analysis**

Variables	Odds ratio	95% CI	P
Knowledge	1.08	1.02-1.15	0.014
Perceived barriers	0.94	0.89-0.99	0.017
Health motivation	1.11	1.01-1.22	0.023

HBM: Health belief model, BSE: Breast self-examination

doctors and health-care personnel, books, publications, and educational materials, respectively.

## DISCUSSION

Based on the results of the current study, while 35% of the subjects performed BSE on a monthly basis, only 10.5% of them were aware of the correct time of self-examination and they informed that they know the right way to perform BSE, in other words, they do the right activity properly. Based on studies in Iran, monthly BSE performance was 0.9-49.9%.<sup>[12,27,33,34]</sup> Given that, the present target group is health workers, the percentage of doing desirable behavior in them is very low while in addition to being part of the healthcare staff, they can act as role model in rural communities since they can have a significant impact on women's health behaviors.

In the current study, despite the low percentage of doing favorable behavior, the knowledge score of health workers was relatively high which was similar to the outcomes obtained in a study by Gençtürk *et al.* in midwifery students.<sup>[35]</sup>

However, some of the studies, including a research by Shahbazi and Heidari on nursing and midwifery staff, indicated a low rate of knowledge of subjects about BSE.<sup>[32,36,37]</sup> In the present research, knowledge

of predictors of the optimal BSE behavior based on logistic regression analysis is similar to the results of some studies.<sup>[37]</sup> It should be noted that the scores of knowledge in the studied health workers were low in key questions related to the desired behavior that is the right time to perform a BSE as well as recognition of risk factors for breast cancer which should be considered in interventions.

With timely diagnosis and treatment of cancerous masses, development of cancer as well as spending a lot of money on families, governments, and insurance companies can be prevented and this is only possible with proper training. Training in the group of health workers with emphasis on their effective educational role is very important for a huge group of women in society, especially the deprived areas of Iran who have lower levels of literacy than urban women.

The results of the present study suggest that why initial and in-service training on BSE in female health workers has not increased the optimal performance of this behavior despite raising knowledge and it draws attention to the fact that training can be done without considering and influencing beliefs and attitudes as well as without using the behavior patterns in health education and promotion. Therefore, the emphasis should be placed on the fact that health workers who should do self-care activities regularly about the natural shape of the breast in addition to having full knowledge and skills about them. They should be susceptible to any changes made to their breast and immediately follow-up additional screenings. In this regard, health workers should also train rural women; thus, some educational programs should be taken into account.

In this study, perceived barriers are good predictors of behavior, and the result is similar to the some other

studies<sup>[17,27,38]</sup> while this construct in some other studies has not been predictor of behavior.<sup>[22,23,39-41]</sup> According to Janz, Champion, and Strecher, perceived barriers are the strongest predictor of behavior in the HBM and its reduction is one of the best practices affecting self-care behaviors. It should be noted that often, having an influence on barriers is not easily possible.<sup>[42]</sup> Based on this model, the barriers to health promotion behaviors may be abstract or real.<sup>[43]</sup> To diminish target barriers, educational interventions must identify the real and conceivable barriers to the behavior and focus on the most important of them.<sup>[42]</sup>

Regarding the most important barriers to optimal BSE, the items including “performing a monthly BSE makes me concerned about breast cancer,” “I feel I cannot do the BSE correctly,” and “It is difficult for me to remember the timing of BSE” are respectively the most relevant ones to lack of BSE behavior. Therefore, in planning for educational interventions for this group, the above-mentioned fields should be taken into account as base for exerting influence on perceived barriers and performing desirable behaviors. There was also a significant relationship between the item “BSE makes me concerned” and performance in the study by Rigi *et al.*<sup>[24]</sup>

Another construct of predicting behavior in the present research was health motivation. In some studies similar to the present study, health motivation was considered as the predictor of behavior<sup>[24,44]</sup> while in some, the motivation for health has not been predictor of behavior.<sup>[41]</sup>

Furthermore, among the health motivation construct, items including “I exercise at least 3 times a week,” “I want to quickly find my health problems,” and “even if I’m not patient, I check my health status regularly” were, respectively, the most relevant ones with performing optimal BSE. In the study by Rigi also the item “I want to quickly find my health problems” was highly correlated with performance.<sup>[24]</sup>

Average reverse correlation among the self-efficacy and perceived barriers in this study represents indirect role of the perceived self-efficacy in optimal behavior. Normally, self-efficacy affects perceived barriers so that higher self-efficacy causes reduction in the perceived barriers to behavior, and thus, it can lead to the promotion of targeted behavior indirectly.<sup>[43,45]</sup> On the other hand, the average direct correlation among the constructs of self-efficacy and health motivation in the current study demonstrates the indirect role of perceived self-efficacy once again in the desired behavior. It is, therefore, necessary to consider the influence on the perceived self-efficacy construct in educational interventions for health workers in Guilan Province. In most similar studies,

self-efficacy is predictor of behavior.<sup>[17,22,23,27,37-41,46,47]</sup> High average score of perceived self-efficacy construct in the present study can be a factor in enhancing the readiness of individuals to make changes in their behavior and acceptance of new behaviors.

In the above examination, the most important cues to action were physicians and other staff in the health-care sector which is similar to the study by Shahroodi *et al.*<sup>[46]</sup> Considering the low percentage of doing desirable behavior in our study indicates the need to target on the mentioned cues as well as having an influence on them to improve the behavior in this field. The results of the present study which was conducted in Guilan Province and covered the community of women health workers can be used in planning and being a basis for educational interventions.

To reduce self-reporting problem which was one of the limitations of this study and attract better partnerships and trust building, the research objectives were expressed initially and then people were assured that the information would remain untitled and confidential. Moreover, the questionnaires were collected in groups.

## CONCLUSION

According to the results of the current study which was done at the level of Guilan Province and covered the women health workers, the rate of optimal BSE behavior in this group who can be as role models for women’s health behaviors in rural communities was very low. Knowledge and constructs of perceived barriers as well as health motivation based on HBM were the most important predictors of optimal BSE behavior. Therefore, educational interventions are proposed on this basis.

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## REFERENCES

1. Jemal A, Siegel R, Xu J, Ward E. Cancer statistics, 2010. *CA Cancer J Clin* 2010;60:277-300.
2. Mousavi SM, Gouya MM, Ramazani R, Davanlou M, Hajsadeghi N, Seddighi Z, *et al.* Cancer incidence and mortality in Iran. *Ann Oncol* 2009;20:556-63.

3. Emami RS, Aghajani H, Haghazali M, Nadali F, Ramazani F, Dabiri E, *et al.* The most common cancers in Iranian women. *Iran J Public Health* 2009;1:109-12.
4. Lodha RS, Nandeshwar S, Pal DK, Shrivastav A, Lodha KM, Bhagat VK, *et al.* Risk factors for breast cancer among women in Bhopal urban agglomerate: A case-control study. *Asian Pac J Cancer Prev* 2011;12:2111-5.
5. Harirchi I, Kolahdoozan S, Karbakhsh M, Chegini N, Mohseni SM, Montazeri A, *et al.* Twenty years of breast cancer in Iran: Downstaging without a formal screening program. *Ann Oncol* 2011;22:93-7.
6. Abachizadeh K, Keramatinia A. Anticipating cancer rates of Iran in 2025. *Community Health (Bristol)* 2016;1:66-73.
7. Sharifian A, Pourhoseingholi MA, Emadedin M, Rostami Nejad M, Ashtari S, Hajizadeh N, *et al.* Burden of breast cancer in Iranian women is increasing. *Asian Pac J Cancer Prev* 2015;16:5049-52.
8. Harris R, Levininger L. Clinical strategies for breast cancer screening: Weighing and using the evidence. *Ann Intern Med* 1995;122:539-47.
9. Mousavi SM, Montazeri A, Mohagheghi MA, Jarrahi AM, Harirchi I, Najafi M, *et al.* Breast cancer in Iran: An epidemiological review. *Breast J* 2007;13:383-91.
10. Sadjadi A, Nouraie M, Ghorbani A, Alimohammadian M, Malekzadeh R. Epidemiology of breast cancer in the Islamic republic of Iran: First results from a population-based cancer registry. *East Mediterr Health J* 2009;15:1426-31.
11. Davidson T. Abortion and breast cancer: A hard decision made harder. *Lancet Oncol* 2001;2:756-8.
12. Naghibi SA, Shojaizadeh D, Montazeri A, Yazdani Cherati J. Sociocultural factors associated with breast self-examination among Iranian women. *Acta Med Iran* 2015;53:62-8.
13. Ministry of Health and Medical Education, Deputy for Health. Package of Essential Non-Communicable (PEN) Disease Interventions for Primary Health Care In Iran (IraPEN), (Implementation Tools for Midwife). Tehran: Office of Non-Communicable Diseases Management; 2017.
14. Hocaoglu M, Erşahin AA, Akdeniz E. Evaluation on the practice and behaviour of women applied for gynecology outpatient clinics about screening methods for early diagnosis of breast cancer. *Eur J Breast Health* 2017;13:150-5.
15. Lawrence CA, Grube BJ, Giuliano AE. Benign breast diseases. In: Ansari SH, editor. *Gynecology*. 15<sup>th</sup> ed. Tehran: Berek and Novak's; 2015. p. 605-27.
16. Kumarasamy H, Veerakumar AM, Subhathra S, Suga Y, Murugaraj R. Determinants of awareness and practice of breast self examination among rural women in Trichy, Tamil Nadu. *J Midlife Health* 2017;8:84-8.
17. Akhtari-Zavare M, Juni MH, Ismail IZ, Said SM, Latiff LA. Health beliefs and breast self-examination among undergraduate female students in public universities in Klang valley, Malaysia. *Asian Pac J Cancer Prev* 2015;16:4019-23.
18. Taymoori P, Berry T. The validity and reliability of champion's health belief model scale for breast cancer screening behaviors among Iranian women. *Cancer Nurs* 2009;32:465-72.
19. Stokes E, Ashcroft A, Platt MJ. Determining liverpool adolescents' beliefs and attitudes in relation to oral health. *Health Educ Res* 2006;21:192-205.
20. Mohamed H, Ibrahim YM, Lamadah SM, Hassan M, El-Magd A. Application of the health belief model for breast cancer screening and implementation of breast self-examination educational program for female students of selected medical and non-medical faculties at Umm al Qura university. *Life Sci J* 2016;13:21-33.
21. Shojaezadeh D. *Health Education Models*. 1<sup>st</sup> ed. Tehran: Communication and health education center publisher; 2000. p. 15-38.
22. Noroozi A, Jomand T, Tahmasebi R. Determinants of breast self-examination performance among Iranian women: An application of the health belief model. *J Cancer Educ* 2011;26:365-74.
23. Rigi DN, Khojasteh F, Bandani F. Breast cancer and breast self-examination: acknowledgement and attitude based on health belief model in literature and engineering colleges of Sistan Balochestn University female students. *Iran J Breast Dis* 2012;5:65-73.
24. Rigi SN, Saravi FK, Navidian A, Khazaiyan S, Poor MS, Sanavi FS. The effect of teaching breast self-examination based on health belief model in teachers in Zahedan. *Med Surg Nurs J* 2012;1:24-30.
25. Sharma M. *Theoretical Foundations of Health Education and Health Promotion*. 3<sup>rd</sup> ed. London: Jones and Bartlett Learning; 2016.
26. Champion VL. Instrument refinement for breast cancer screening behaviors. *Nurs Res* 1993;42:139-43.
27. Hasani L, Aghamolaei T, Tavafian S, Zare S. Constructs of the health belief model as predicting factors in breast self-examination. *Hayat* 2011;17:62-9.
28. Karayurt O, Dramali A. Adaptation of champion's health belief model scale for Turkish women and evaluation of the selected variables associated with breast self-examination. *Cancer Nurs* 2007;30:69-77.
29. Zelviene A, Bogusevicius A. Reliability and validity of the champion's health belief model scale among Lithuanian women. *Cancer Nurs* 2007;30:E20-8.
30. Parsa P, Kandiah M, Mohd Nasir MT, Hejar AR, Nor Afiah MZ. Reliability and validity of champion's health belief model scale for breast cancer screening among Malaysian women. *Singapore Med J* 2008;49:897-903.
31. Karimy M, Hasani M, Khoram R, Ghaffari M, Niknami S. The effect of education, based on health belief model on breast self-examination in health liaisons of Zaranjeh city. *Zahedan J Res Med Sci* 2008;10:281-9.
32. Hatfania E, Niknami S, Mahmoudi M, Ghofranipour F, Lamyan M. The effects of health belief model education on knowledge, attitude and behavior of Tehran pharmaceutical industry employees regarding breast cancer and mammography. *Behbood J* 2010;14:42-53.
33. Kashfi S, Jeihooni AK, Yazdankhah M. The effect of education about breast self-examination on knowledge, attitude and practice of women in Nourabad Mamasani health clinics, 2009. *J Jahrom Univ Med Sci* 2012;10:36-40.
34. Lalouei A, Kashani-Zadeh N. Rate of woman's awareness about self-breast examination in Najmieh and Baqiyyatollah Hospitals referrers. *J Rehabil* 2006;7:66-9.
35. Gençtürk N, Demirezen E, Ay F. Health beliefs of midwifery students at Istanbul university about breast cancer and breast self-examination acknowledgements. *J Cancer Educ* 2017;32:784-9.
36. Shahbazi S, Heidari M. Assessment of the knowledge and attitudes of nursing and midwifery personnel about breast self-examination. *Iran J Obstet Gynecol Infertil* 2014;17:7-12.
37. 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;4:24-9.
38. Abolfotouh MA, BaniMustafa AA, Mahfouz AA, Al-Assiri MH, Al-Juhani AF, Alaskar AS, *et al.* Using the health belief model to predict breast self-examination among Saudi women. *BMC Public Health* 2015;15:1163.
39. Momenyan S, Rangraz JM, Sanei IF, Adibi GZ, Sarvi F. Prediction of breast self-examination in a sample of nursing and midwifery students Qom city using health belief model, Iran. *Qom Univ Med Sci J* 2014;8:28-33.
40. Shiryazdi SM, Kholasehzadeh G, Neamatzadeh H, Kargar S. Health beliefs and breast cancer screening behaviors among Iranian female health workers. *Asian Pac J Cancer Prev* 2014;15:9817-22.
41. Tastan S, Iyigün E, Kılıç A, Ünver V. Health beliefs concerning breast self-examination of nurses in turkey. *Asian Nurs Res (Korean Soc Nurs Sci)* 2011;5:151-6.
42. Glanz K, Rimer BK, Viswanath K. *Health Behavior and Health Education: Theory, Research, and practice*. New York: John Wiley and Sons; 2008.
43. Pender NJ, Murdaugh CL, Parsons MA, Ann M. *Health*

- Promotion in Nursing Practice. 7<sup>th</sup> ed. Boston: Pearson; 2014.
44. Hajian-Tilaki K, Auladi S. Health belief model and practice of breast self-examination and breast cancer screening in Iranian women. *Breast Cancer* 2014;21:429-34.
  45. Shilan A, Kasmaei P, Farmanbar R, Shakiba M, Mahdaviroshan M, Zareban I, *et al.* Factors predicting nutritional behaviors related to gastric cancer: A model-guided study. *Drug Invent Today* 2018;10:936-41.
  46. Shahroodi MV, Pourhaje F, Esmaily H. Investigating the effectiveness of protection motivation, perceived self-efficacy and perceived response costs by behavior of breast self-examination. *Iran J Obstet Gynecol Infertil* 2013;15:1-9.
  47. Karimy M, Araban M, Zareban I, Taher M, Abedi A. Determinants of adherence to self-care behavior among women with type 2 diabetes: An explanation based on health belief model. *Med J Islam Repub Iran* 2016;30:368.

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