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Effect of Educational Intervention Based on the Theory of Planned Behavior on Mammography Performance in Iranian Women: a Randomized Controlled Trial Study

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ABSTRACT

Aims Breast cancer is the leading cause of cancer death among women in Asia, including Iran. Mammography is used for the early detection of breast cancer for about 73% of cases. This study aimed to determine the effect of educational intervention on mammography among women referring to health centers using planned behavior theory.

Materials & Methods This randomized controlled trial study was conducted on 140 women referring to Health Centers in Khorramabad in 2018 who were randomly selected and divided into two experimental and control groups. Data collection tools consisted of a demographic information questionnaire, knowledge, and researcher-made questionnaire based on the TPB structures. The intervention was held in four 45 minute sessions for four weeks. Both groups completed the questionnaires before and three months after the intervention. The data were analyzed by SPSS 23 software using chi-square, independent t-test, and paired t-test.

Findings After the educational intervention, Mean±SD constructs of knowledge, attitude, subjective norms, perceived behavioral control, and the behavioral intention was 10.97±5.07, 41.24±3.44, 26.54±5.3, 47.36±3.91, and 8.87±2.78, respectively. All the mentioned constructs were statistically significant ($p<0.05$). Moreover, the rate and percentage of mammography in women in the experimental group (31=44.3%) compared to the control group (3= 4.3%) was significantly different ($p<0.001$).

Conclusion The present study's findings confirmed the effectiveness of an educational program based on the TPB in promoting mammography.

Keywords Mammography; Theory of Planned Behavior; Education; Iran

CITATION LINKS

[1] The challenges and solutions for action of social ... [2] The assessment of relationship between mental ... [3] Global cancer ... [4] Comparison of two different educational methods ... [5] Perceived behavioral control in mammography: A ... [6] The use of nanoparticles in diagnosis and treatment ... [7] Religious, cultural, and social beliefs of ... [8] Performance conditions of breast cancer ... [9] Literacy and breast cancer prevention: A ... [10] Effectiveness of breast cancer screening ... [11] Perception of breast cancer screening ... [12] Understanding women's mammography ... [13] effects of health belief model education ... [14] Effect of an educational intervention ... [15] Effects of an educational intervention ... [16] Predictors of quality of life in transfusion ... [17] The impact of educational intervention programs ... [18] Perceived behavioral control, self-efficacy ... [19] Attitudes, personality ... [20] Determinants of breast self-examination performance ... [21] The effect of instruction on students' knowledge ... [22] Statistical power analysis jbr the ... [23] Effects of a randomized controlled trial ... [24] The effect of training on the knowledge levels ... [25] Predictors of mammography based on health belief ... [26] Change in breast cancer screening knowledge ... [27] Effect of health education methods on promoting ... [28] Effect of education based on the health ... [29] Cancer screening in native Americans ... [30] Predictors of regular mammography use among ... [31] Using the theory of planned behavior ... [32] Assessment of effectiveness of an educational ... [33] The theory of planned ... [34] The impact of educational intervention ... [35] Changing attitude, subjective norm, perceived ... [36] Application of planned behavior theory in predicting ... [37] Effectiveness of cultivando la salud: A breast ... [38] Increasing screening mammography among predominantly ...

Introduction

Health determinants include genetics, individual behaviors, ideas, beliefs, physical and social environment, economic conditions, and access to health information and services [1]. Cancer is one of the world's major health problems and causes more than 7 million deaths a year [2]. Breast cancer accounts for 23% of all cancers in women and is the most common cancer type among women worldwide [3]. It is a growing global health problem, especially in developing countries. Although its incidence in developing countries is only 5 percent, it accounts for three-quarters of all disease deaths [4]. Khazir quotes from the WHO, 2015, in poor communities, most women are diagnosed with late-stage disease and their 5-year survival rate is 10 to 40%. In more developed communities, where the disease is diagnosed and treated in the early stages, the 5-year survival rate reaches 80% [5]. Annually, more than 1.1 million new cases of breast cancer are diagnosed globally, and over 41,000 deaths occur as a result of the disease [6]. Breast cancer is one of the most common cancers in Asia, including Iran, and the leading cause of cancer death among women [7]. Mammography can detect nearly 73% of the cases, and screening measures without mammography, can only detect up to 39% of the cases; therefore, mammography will be one of the main components of the breast cancer screening program [8]. Although mammography use has increased in developed countries, Iranian women's mammography usage rate is low [9]. Mammography can reduce the risk of dying from breast cancer in women. Women aged 50-69 years are recommended to have regular mammography [10]. Many studies have been done in Iran and the world in mammography based on the TPB. However, most of them are descriptive or qualitative, and limited studies conducted as an intervention in the field of breast cancer diagnosis behaviors, such as breast self-examination, clinical examination, and mammography, have been done as a combination of these behaviors [11, 12]. These studies have also shown that an educational intervention based on the TPB and based on the behavior culture promotes breast cancer diagnosis [13, 14]. Education will cause lasting changes in people's attitudes, intentions, and behaviors and ultimately change their way of life [15]. Health education is a tool that enables people to have more control over their health and the factors affecting their health [15]. The use of behavioral change theories increases the probability of increasing the impact of health education programs and involves individual characteristics and the environment that somehow affect behaviors in health education interventions [16]. The model used in the present study to promote mammography's intention and performance in women referring to health centers is the theory of planned behavior (TPB), which has been used in many studies, including mammography [17]. This theory pays attention to social factors, such as social norms and motivation to comply with important people; therefore, many studies consider it an important factor in accepting desirable behaviors, such as mammography [14]. According to previous studies, mammography is affected by cultural values and beliefs [13]. Therefore, this model can examine the behavior from a cultural point of view and in this regard, it can further promote mammography. According to the TPB, an individual's behavior is determined by his/her behavioral intention, in other words, behavioral intention predicts behavior. According to the theory, behavioral intention is a function of three factors, including attitude, subjective norms, and perceived behavioral control. An individual's belief in the consequences of a behavior and his/her evaluation of these results lead to attitude formation [12]. subjective norms refer to the pressure perceived by important people in an individual's life to perform or not perform a particular behavior [18]. Perceived behavioral control construct refers to an individual's perception of control over behavior, which is a reflection of previous facilitators and barriers to the behavior [19].

Given that breast cancer is the most common cancer among Iranian women [20] and delays in diagnosing and treating the disease reduce the chances of survival [21]. So far, no study has been conducted to evaluate the delay of educational intervention in performing mammography among women in Khorramabad; the present study aimed to determine the effect of educational intervention on mammography among women using the TPB.

Materials and Methods

The present study is a randomized controlled trial conducted on 140 women referring to Health Centers in Khorramabad, Iran, in 2018. The study samples were selected using a simple random sampling method and randomly assigned to the experimental and control groups (70 subjects in each group). Out of 15 health centers, four centers were selected using simple random sampling. Then, two centers were randomly selected as the experimental group and two centers as the control group. Finally, 35 people from each center and the list of women aged 50 to 70 years were randomly selected and entered into the study. The sample size considering the confidence interval, the significance level of 5%, test power 80%, the mean difference of 2, and standard deviation of 4.2, was estimated to be 70 people in each group and a total of 140 people [22]. The inclusion criteria included having a family record in health centers, 50 to 70 years old, no history of breast cancer in first-degree relatives (mother, sister, grandmother, and aunt), and willingness to participate in the study. The exclusion criteria also consisted of unwillingness to continue cooperation, having debilitating physical

and mental illnesses, and being absent for more than two sessions during educational sessions.

The research team prepared a researcher-made questionnaire after extensive library studies and interviewing the subjects to prepare the study tools. The data collection tool consisted of three parts. The first part was the demographic information, such as the participants' age, marital status, education level, occupation, and Insurance. The second part was the knowledge questionnaire, which was designed by Hatefnia *et al.* [13]. It consists of 15 questions that measure the subjects' knowledge about breast cancer and mammography screening behavior. Each correct and wrong response was given a score of 1 and 0, respectively. Its validity and reliability were also confirmed. The third part of the researcher-made questionnaire was based on the TPB constructs, including behavior attitude (8 questions; such as "Mammography causes early detection of breast cancer"), subjective norms (7 questions; such as "The staff at the health center recommend me to do mammography"), perceived behavioral control (13 questions; such as "Mammography is difficult due to the fear of a lump in the breast"), and behavioral intention (3 questions; such as "I am going to do mammography in the next three months") and behavior such as "Have you done mammography in the last three months", using a 5-point Likert scale from strongly agree to disagree strongly (score of 5 to 1) in the field of mammography. This questionnaire was designed based on the viewpoint of experts in health education and 20 women referring to health centers. The quantitative and qualitative methods were used to confirm face validity. Qualitative face validity was determined in a 15-member panel consisting of reproductive health and health education specialists to find the level of difficulty, degree of inconsistency, the ambiguity of expressions, or the existence of inadequacy in the meanings of words. Their opinions resulted in minor changes in the questionnaire. To determine quantitative face validity, the impact score of each question was calculated. To confirm qualitative content validity, 15 health education specialists were asked to write their corrective views after carefully studying the study tool. It was also emphasized that in qualitative evaluation of content validity, they should consider the grammar, the use of appropriate words, the importance of the questions, and the placement of the questions in the appropriate place. After collecting the experts' opinions, necessary changes were considered in the tool. Then, in quantitative content validity, the content validity ratio (CVR) was used to ensure that the most important and correct content (question necessity) was selected and to ensure that the tool questions were best designed to measure the content, content validity index (CVI) was used. To determine the content validity, the questionnaire was sent to 15 reproductive health and health education specialists, and they were asked to respond to each of the tool questions (necessary), (not necessary but useful), and (not necessary).

Test-retest was used to evaluate the reliability of the questionnaire. Cronbach's alpha values for the constructs of attitude, subjective norms, perceived behavioral control, and the behavioral intention was 0.74, 0.88, 0.71, and 0.90, respectively. The CVI results indicated that all questions had a score higher than 0.78 and were considered appropriate. The initial questionnaire consisted of 35 items. Thirty-one items had a content validity ratio (CVR) higher than 0.62, and four items did not obtain this score and were removed from the questionnaire. The impact score obtained for all tool items was above 1.5, which was acceptable. Finally, 31 questions were included in the main questionnaire

The ethics committee approved the ethical Permission of Shahid Sadoughi University of Medical Sciences, Yazd, Iran. Written informed consent was obtained from all participants in the study. The educational intervention was designed based on the TPB and according to the results of the pre-test stage. It was implemented for the experimental group. The intervention was performed in four 45-minute educational sessions for four weeks [23]. The details of the program are presented in Table 1.

Table 1) Educational program implemented among the subjects in the experimental group

Sessions	Objectives	A summary of topics and activities
First	Promoting knowledge	Providing information about breast cancer risk symptoms, the importance, and necessity of early detection of breast cancer, complications, and consequences of breast cancer.
Second	Changing and improving attitude	Topics, including whether mammography is pleasant and useful or unpleasant and harmful, and its positive effects on women's health were discussed.
Third	Subjective norms (positive effect of family and doctor on mammography)	In this session, the subjects' girls were educated about the benefits of mammography for women's health by a reproductive health specialist, and also some explanations were provided about encouraging and supporting their mothers regarding mammography.
Fourth	- Familiarity of women with perceived barriers to mammography - Promoting women's ability and self-efficacy to do mammography	Mammography barriers and the ways to overcome them were presented. The steps of mammography were presented visually.

Three months after the educational intervention, the questionnaire was completed by the participants of both groups, and for the illiterate participants, the questionnaire was completed by the researcher through an interview. After the post-test, an

educational pamphlet and a booklet were given to the control group.

The data were analyzed by SPSS 23 software and using descriptive statistics (frequency and mean±SD) and Chi-square, paired t-test, and independent t-test. An independent t-test was used to compare the mean scores of the control and experimental groups. Paired t-test was also used to compare the scores of constructs before and after the educational intervention. A Chi-square test was also used to evaluate the effectiveness of the educational intervention on the experimental group in terms of mammography rate.

Findings

The mean age was 56.35±4.53 years in the experimental group and 57.30±5.25 years in the control group. Before the educational intervention, there was no statistically significant difference between the two groups in terms of demographic variables (p>0.05; Table 2).

Table 2) Comparison of frequency of demographic information in the experimental and control groups before the educational intervention (70 subjects in each group)

Variable	Experimental group N (%)	Control group N (%)	p-value
Age			
50-60	54 (77.1)	50 (71.4)	0.564
60-70	16 (22.9)	20 (28.6)	
Marital status			
Married	58 (82.9)	54 (77.1)	0.192
Single	3 (4.3)	1 (1.4)	
Divorce/widow	9 (12.8)	15 (21.5)	
Educational level			
Illiterate	9 (12.9)	9 (12.9)	0.263
Lower than high school diploma/high school diploma	53 (75.7)	45 (64.3)	
Academic	8 (11.4)	16 (22.9)	
Occupation			
Employee	12 (17.1)	15 (21.4)	0.520
Housewife	58 (82.9)	55 (78.6)	
Insurance			
Yes	42 (60.00)	41 (58.6)	0.501
No	28 (40.00)	29 (41.4)	

Table 3) Comparison of statistical mean±SD scores of knowledge and TPB constructs between the experimental and control groups before and after the educational intervention

Constructs	Experimental group	Control group	Mean difference±SE	p.	Effect size
Knowledge					
Before intervention	8.53±3.16	9.00±3.08	-0.47±0.53	0.384*	0.149
After intervention	10.97±5.07	8.95±3.08	2.02±0.71	0.005*	0.484
Mean difference±SE	-2.44±0.68	0.05±0.06	-	-	-
Effect Size	0.430	0.080	-	-	-
p-value	0.001**	0.495**	-	-	-
Attitude					
Before intervention	37.39±4.62	36.31±5.22	1.08+0.83	0.20*	0.218
After intervention	39.82±4.20	36.20±5.30	3.61±0.80	<0.001*	0.756
Mean difference±SE	-2.43±0.45	0.11±0.77	-	-	-
Effect Size	0.635	0.018	-	-	-
p-value	<0.001**	0.883**	-	-	-
Subjective norms					
Before intervention	24.65±6.43	23.77±5.41	0.88±1.00	0.380*	0.149
After intervention	26.54±5.35	24.24±5.43	2.30±0.91	0.01*	0.426
Mean difference±SE	-1.88±0.42	-0.47±0.30	-	-	-
Effect Size	0.252	0.207	-	-	-
p-value	<0.001**	0.122**	-	-	-
Perceived behavioral control					
Before intervention	37.72±4.77	38.41±4.75	-0.69±0.81	0.402*	0.143
After intervention	40.23±4.56	38.62±4.72	1.61±0.79	0.044*	0.347
Mean difference±SE	-2.51±0.38	-0.21±0.17	-	-	-
Effect Size	0.792	0.147	-	-	-
p-value	<0.001**	0.228**	-	-	-
Behavioral intention					
Before intervention	7.90±2.21	7.64±2.16	0.26±0.43	0.552*	0.101
After intervention	8.87±2.78	7.31±2.29	1.56±0.37	<0.001*	0.698
Mean difference±SE	-0.97+0.26	0.33±0.33	-	-	-
Effect Size	0.441	0.122	-	-	-
p-value	0.001**	0.313**	-	-	-

*Independent t-test,**Paired t-test

After the educational intervention, Mean±SD constructs of knowledge, attitude, subjective norms, perceived behavioral control, and the behavioral intention was 10.97±5.07, 41.24±3.44, 26.54±5.3, 47.36±3.91, and 8.87±2.78, respectively. Moreover, the mean difference±SE of the mentioned constructs were 2.02±0.71, 3.61±0.80, 2.30±0.91, 1.61±0.79, and 1.56±0.37, respectively. All the mentioned constructs were statistically significant ($p<0.05$; Table 3).

Moreover, the rate and percentage of mammography in women in the experimental group compared to the control group was significantly different ($p<0.001$; Table 4).

Table 4) Rate of mammography in both experimental and control groups before and after the educational intervention ($p<0.001$)

Behavior after intervention	Performing Mammography		Not Performing Mammography	
	Number	Percent	Number	Percent
Experimental	31	44.3	39	55.7
Control	3	4.3	67	95.7

Discussion

In this study, following the educational intervention's implementation, the mean score of knowledge and the studied constructs (attitude, subjective norms, perceived behavioral control, behavioral intention, and behavior of mammography) in the experimental group increased significantly compared to the pre-intervention stage; In contrast, in the control group, these differences were not significant. Furthermore, the experimental group has studied constructs' mean score increased significantly compared to the control group, while these differences were not significant at the pre-intervention stage. In other studies, after implementing the educational intervention, a significant difference was observed in the mean score of the TPB constructs [13, 14]. These findings indicate that the designed educational intervention effectively increased knowledge, attitude, subjective norms, perceived behavioral control, behavioral intention, and behavior.

The present study results showed no significant difference between the mean score of knowledge before and after the intervention in the experimental group compared to the control group. This finding is in line with the results of other studies [24, 25]. The results of a study by Salinas *et al.* entitled "Changes in breast cancer knowledge by changing the intention of mammography in Mexican women" showed that education has an effective role in promoting Mexican women's knowledge [26]. The present study results and the mentioned studies show the effect of educational intervention based on the TPB on promoting women's knowledge about breast cancer.

Comparison of the mean scores of attitude towards mammography showed that the difference between the mean scores of attitude towards behavior also increased significantly after education in the experimental group. This result is consistent with the study of Sadeghnezhad *et al.*, which was performed to compare health education methods in promoting breast self-examination in both experimental and control groups [27], and also with the results of the study by Khani-Jeihooni *et al.* [28].

The results showed a significant difference between the mean scores of subjective social norms before and after the experimental group intervention, while this difference was not significant in the control group. The study results by Pandhi *et al.* showed that the most important predictor of general or specific cancer screening is the physician or nurse's recommendation for mammography [29]. Moreover, the study of Tolma *et al.* performed on 255 women aged 40 to 70 years showed that one of the predictors of mammography among women is having a physician's recommendation [30]. It can be concluded that increasing the recommendations for mammography by women's health issues providers will be one of the most important factors in increasing women's tendency to perform mammography.

Moreover, the results showed no significant difference between the mean scores of perceived behavioral control before and after the intervention in the control group; however, there was a significant difference between the mean scores of this construct in the experimental group before and after the intervention. This finding is in line with the studies of Ronacancio *et al.* [31], Pakpour [32], indicating the effect of education in the experimental group in eliminating factors, such as fear of cancer diagnosis, fear, embarrassment, and cost that prevent mammography. In the TPB and other models of behavior change, such as Pender's health promotion model, it is stated that higher perceived behavioral control increases positive attitude toward the desired behavior and reduces perceived barriers. If it occurs along with behavioral facilitators and the intended control is more consistent with the actual control, the intention and probability of performing the behavior will increase [33].

Another result of the present study was a statistically significant difference between the intention score before and after the experimental group intervention. Moreover, the results before the intervention showed that behavioral intention scores between the two groups were almost similar. However, after the educational intervention, the experimental group's intention increased significantly, while it was not statistically significant in the control group. The above finding is in line with the results obtained from other studies [34]. Moreover, the present study results are in line with the findings of the study by Sheikhan *et al.* They reported that after the educational intervention, the intention to perform mammography in the experimental group significantly increased compared to the control group [35]. This result and the results of other studies have

determined the intention variable as a necessary introduction to performing a behavior so that by increasing in intention, success in performing a behavior increases. However, the intention is always introduced as a variable whose existence is necessary to perform a behavior but not enough; in other words, it can be said that there is no 100% relationship between intention and behavior [36].

The present study on mammography, which is the studied variable, showed that out of 70 participants in the educational intervention program, 31 participants performed mammography three months after the intervention; however, only 3 participants performed mammography in the control group. The chi-square test results showed that the rate of mammography after the educational intervention in the experimental group increased significantly compared to the control group. The results of the study of Fernandez *et al.* confirm the mentioned finding regarding the educational intervention effectiveness, which reported that 40.8% in the experimental group and 29.9% in the control group performed mammography after the educational intervention [37]. In Goel's study, the educational intervention increased mammography performance by 33% in Spanish women in the experimental group [38]. Besides, the study results by Salinas *et al.* showed that education has an effective role in increasing the level of knowledge and thus promoting mammography in Mexican women [26].

Given that the educational intervention based on the TPB effectively promoted the intention and behavior of mammography, it is suggested that similar educational interventions be implemented and evaluated based on the same model in women of other age groups. Furthermore, considering the time limit in this intervention, it is suggested that the long-term effects (6 months and more) of the intervention be examined in future studies.

Conclusion

The present study's findings confirmed the effectiveness of an educational program based on the TPB in promoting mammography.

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References

1- Zaboli R, Sanaeinasab H. The challenges and solutions for action of social determinants of health in Iran: A qualitative study. Iran J Health Educ Health Promt. 2014;2(1):5-16. [Persian]

2- Mardani Hamule M, Shahraki Vahed A. The assessment of relationship between mental health and quality of life in cancer patients. Avicenna J Clin Med. 2009;16(2):33-8. [Persian]

3- Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. CA Cancer J Clin. 2011;61(2):69-90.

4- Avci IA, Gozum S. Comparison of two different educational methods on teachers' knowledge, beliefs and behaviors regarding breast cancer screening. Eur J Oncol Nurs. 2009;13(2):94-101.

5- Khazir Z, Morowatisharifabad MA, Vaezi A, Enjezab B, Yari F, Fallahzadeh H. Perceived behavioral control in mammography: A qualitative study of Iranian women's experiences. Int J Cancer Manag. 2019;12(8):90225.

6- Salehzadeh M, Norouzian P, Abbasalipourkabir R. The use of nanoparticles in diagnosis and treatment of breast cancer: A review. Pajouhan Sci J. 2015;13(2):1-12. [Persian]

7- Ghaderi I, Kaviani A, Fakhrejahani E, Mehrdad N, Hazar N, Karbakhsh M. Religious, cultural, and social beliefs of iranian rural women about breast cancer: A qualitative study. Arch Breast Cancer. 2014;1(1):25-31.

8- Farshbaf Khalili A, Shahnazi M, Ghahvehchi A, Torabi SS. Performance conditions of breast cancer screening methods and its efficient factors among women referring to health centers of Tabriz. Iran J Nurs Res. 2009;4(13-12):27-38. [Persian]

9- Harirchi I, Azary S, Montazeri A, Mousavi SM, Sedighi Z, Keshtmand G, et al. Literacy and breast cancer prevention: A population-based study from Iran. Asian Pac J Cancer Prev. 2012;13(8):3927-30.

10- 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 U.S. preventive services task force recommendation. Ann Intern Med. 2016;164(4):244-55.

11- Khazaee-Pool M, Majlessi F, Rahimi Foroushani A, Montazeri A, Nedjat S, Shojaeizadeh D, et al. Perception of breast cancer screening among Iranian women without experience of mammography: A qualitative study. Asian Pac J Cancer Prev. 2014;15(9):3965-71.

12- Naito M, O'Callaghan FV, Morrissey S. Understanding women's mammography intentions: A theory-based investigation. Women Health. 2009;49(2-3):101-18.

13- Hatefnia E, Niknami S, Mahmoudi M, Ghofranipour F, Lamyian M. The effects of health belief model education on knowledge, attitude and behavior of Tehran pharmaceutical industry employees regarding breast cancer and mammography. J Kermanshah Univ Med Sci. 2010;14(1):42-53. [Persian]

14- Sargazi M, Mohseni M, Safar-Navade M, Iran-Pour A, Mirzaee M, Jahani Y. Effect of an educational intervention based on the theory of planned behavior on behaviors leading to early diagnosis of breast cancer among women

referred to health care centers in Zahedan in 2013. Iran J Breast Dis. 2014;7(2):45-55. [Persian]
15- Joveini H, Dehdari T, Hashemian M, Maheri M, Shahrabadi R, Rohban A, et al. Effects of an educational intervention on male students' intention to quit water pipe smoking: An application of the theory of planned behavior (TPB) and health action process approach (HAPA). J Educ Community Health. 2020;7(2):73-80. [Persian]
16- Maheri M, Rohban A, Sadeghi R, Joveini H. Predictors of quality of life in transfusion-dependent thalassemia patients based on the Precede model: A structural equation modeling approach. J Epidemiol Glob Health. 2020;10(2):157-63.
17- Hazavehei SMM, Ezzati-Rastegar K, Dogonchi M, Salimi N, Gheisvandi E. The impact of educational intervention programs to promoting mammography screening: A systematic review. J Educ Community Health. 2016;3(1):58-67. [Persian]
18- Ajzen I. Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. J Appl Soc Psychol. 2002;32(4):665-83.
19- Ajzen I. Attitudes, personality, and behavior. London: McGraw-Hill Education; 2005.
20- 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(2):365-74.
21- Farah F, Tabeshian A, Karimabade N, Hasanzade A. The effect of instruction on students' knowledge and attitude towards breast self-examination. Qom Univ Med Sci J. 2011;4(4):21-6. [Persian]
22- Cohen J. Statistical power analysis jbr the behavioral. Sciences. London: Routledge; 2013.
23- Taymoori P, Molina Y, Roshani D. Effects of a randomized controlled trial to increase repeat mammography screening in Iranian women. Cancer Nurs. 2015;38(4):288-96.
24- Hacihasanoglu R, Gozum S. The effect of training on the knowledge levels and beliefs regarding breast self-examination on women attending a public education centre. Eur J Oncol Nurs. 2008;12(1):58-64.
25- Khazir Z, Morrowati Sharifabad MA, Vaezi AA, Enjezab B, Fallahzadeh H, Yari F. Predictors of mammography based on health belief model in Khorramabad women. J Educ Health Promot. 2019;8:180.
26- Salinas JJ, Byrd T, Martin C, Dwivedi AK, Alomari A, Salaiz R, et al. Change in breast cancer screening knowledge is associated with change in mammogram intention in Mexican-origin women after an educational intervention. Breast Cancer. 2018;12:1-7.
27- Sadeghnezhad F, Niknami S, Ghafari M. Effect of health education methods on promoting breast self-examination (BSE). J Birjand Univ Med Sci. 2009;15(4):38-48. [Persian]
28- Khani Jeihooni A, Ghaedi R, Kashfi SM, Khiyali Z. Effect of education based on the health belief model in the prevention of sexually transmitted diseases in couples participating in pre marriage training classes. J Educ Community Health. 2018;4(4):4-12. [Persian]
29- Pandhi N, Guadagnolo BA, Kanekar S, Petereit DG, Smith MA. Cancer screening in native Americans from the northern plains. Am J Prev Med. 2010;38(4):389-95.
30- Tolma EL, Stoner JA, Li J, Kim Y, Engelman KK. Predictors of regular mammography use among American Indian women in Oklahoma: A cross-sectional study. BMC Women Health. 2014;14:101.
31- Roncancio AM, Ward KK, Sanchez IA, Cano MA, Byrd TL, Vernon SW, et al. Using the theory of planned behavior to understand cervical cancer screening among Latinas. Health Educ Behavr. 2015;42(5):621-6.
32- Pakpour Hajiagha A. Assessment of effectiveness of an educational intervention using the theory of planned behavior, action planning and coping planning to increase and maintain oral self-care behavior in students [dissertation]. Tehran: Tarbiat Modares University; 2011. [Persian]
33- Ajzen I. The theory of planned behavior. Organ Behav Hum Decis Process. 1991;50(2):179-211.
34- Matlabi M, Khajavi A, Askari F, Saberi M. The impact of educational intervention based on theory of planned behavior in breast self-examination of women referred to health centers. Horiz Med Sci. 2018;24(2):132-8. [Persian]
35- Sheykhan R, Sepahvandi M, Ghazanfari F. Changing attitude, subjective norm, perceived behavioral control, mammography self-efficacy regarding breast cancer screening: The effect of an educational intervention in women aged 40 to 60 years. Woman Fam Stud. 2020;7(3):193-209. [Persian]
36- Pakpour Hajiagha A, Saffari M. Application of planned behavior theory in predicting dental brush behavior among Iranian adolescents in Qazvin. J Islam Dent Assoc Iran. 2012;24(3):201-7. [Persian]
37- Fernandez ME, Gonzales A, Tortolero-Luna G, Williams J, Saavedra-Embesi M, Chan W, et al. Effectiveness of cultivando la salud: A breast and cervical cancer screening promotion program for low-income Hispanic women. Am J Public Health. 2009;99(5):936-43.
38- Goel MS, O'Conor R. Increasing screening mammography among predominantly Spanish speakers at a federally qualified health center using a brief pre-visit video. Patient Educ Couns. 2016;99(3):408-13.