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Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_634_21

Systematic review of women's knowledge, attitude, and practice towards breast cancer

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Received: 06-05-2021
Accepted: 29-08-2021
Published: 11-06-2022

Abstract:

The present study aims to systematically review the women's knowledge, attitude, and practice (KAP) of breast cancer (BC) screening methods to get enough information for policymakers to orient the screening strategies. All English KAP studies on BC screening methods in five databases up to January 2021 were included. The quality of the final articles was assessed using the STROBE checklist. The qualitative synthesis was performed. Out of 5574 retrieved articles, 28 were included. About 64% of the articles were of high quality. Overall, there were poor knowledge, negative attitude, and low practice between women. The educational programs and cultural plans can encourage regular screening. Women's excessive optimism to their BC risk should be eliminated by focusing on the risk of the disease, more.

Keywords:

Health knowledge, attitudes, breast neoplasms, cancer early detection, cancer screening test, practice

Introduction

Breast cancer (BC) was allocated 11.7% of all kinds of cancers in 2020.^[1] To date, the new cases of the disease were beyond two million, forecasted to reach more than 3 million cases with more than one million deaths by 2040.^[2,3]

BC was imposed a considerable economic burden on countries as well as public health problems^[4,5] while it can be prevented by early detection strategies.^[6-8] For early diagnosis of BC, the screening of breasts should be performed routinely by women.^[9] Based on the WHO recommendation, women aged 40–49 years or 70–75 years should perform systematic mammography screening.^[10] Although the importance of screening for early detection of BC, the rate of screening methods was low.^[11-13]

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Knowledge is an important variable that affects behavior.^[14,15] Lack of knowledge about BC risk factors as well as screening methods has led to a late disease detection that has increased the risk of death^[16] and mortality.^[17] Attitude is an important factor of women's prevention behavior as knowledge in screening, too.^[18] Negative attitudes, as well as low knowledge, are defined as the barriers of screening methods.^[19] Overall, knowledge, attitudes, and practices correlated positively with each other.^[20]

The present study aims to systematically explore the three outcomes as the knowledge, attitude, and practice (KAP) of females about clinical and nonclinical methods of screening to assess the current situation of women in this era. The results can help policymakers to choose, implement, and prioritize the necessary strategies to encourage women's participation in screening.

How to cite this article: Meshkani Z, Moradi N, Aboutorabi A, Noman S, Motlagh AG, Langarizadeh M. Systematic review of women's knowledge, attitude, and practice towards breast cancer. *J Edu Health Promot* 2022;11:171.

Materials and Methods

It was a systematic review. PubMed, Scopus, Web of Science, ProQuest, and EMBASE databases were searched for articles. The search strategies are presented in Appendix 1.

The protocol for this review was registered on PROSPERO in July 2020 (ID: CRD42020180964).

Inclusion and exclusion criteria

The available published studies as full-text and grey literature up to January 2021 in English, assessed the KAP of BC screening methods were included in the research. No time limit and all of the original as well as case study or cross-sectional papers that the sample size was women older than 16, were included.

Studies that addressed the BC treatment methods, those that considered KAP as a secondary outcome, as well as those not showing explicitly the result of KAP elements, were excluded.

Data selection, extraction, and analysis

Duplicate citations were removed using the Endnote version 8. The remained articles were screened by title and abstract by two reviewers based on the inclusion and exclusion criteria, independently. The full-text of the eligible articles were also screened by two reviewers, independently. A third reviewer was assessed the articles with disagreement.

A qualitative review was performed to analyze.

Quality assessment

The STROBE checklist was used to quality assessment of all of the selected studies.

Results

A total of 5574 papers was retrieved from the databases. Out of 3754 nonduplicated papers in the title, 3710 studies were excluded because of irrelevant titles and abstracts. Out of 44 papers, a number of 28 articles were included [Figure 1].

Study characteristics

A number of 18 articles were performed in Asian countries. Five and four articles were performed in European and African countries, respectively. An article was performed in countries across Africa, the Americas, and Asia.^[21]

No time limit was set, and articles from 1990 up to January 2021 were considered; the frequency of studies was related to 2015 by publishing four articles.^[16,17,22,23]

Four,^[16,24-26] seven,^[22,27-32] and one^[33] studies were focused on rural women, students as well as health workers, and patient females (regardless of the type of disease), respectively. The other selected articles were considered women at least older than 16 years randomly.

All of the articles were performed as cross-sectional and used a self-administrated as well as structured questionnaire to examine women's KAP for screening methods. Table 1 was presented the characteristics and the results of the selected studies.

A total of 22 and 17 articles were addressed the knowledge and attitude of BC screening methods, respectively. A total of 21, 18, and 14 articles were addressed the practice of breast self-examination (BSE), mammograms, and clinical breast examination (CBE) screening methods, respectively.

Study results

We divided the results into three subsections as follows:

Knowledge about breast cancer screening methods

The selected studies were different in terms of questions in knowledge. A study was performed on a focus and qualitative group.^[34] Out of 22 articles that addressed knowledge about BC screening methods, 15 (=68%) reported the poor knowledge of their respondents. Six (=27%)^[11,13,20,21,31,32] and one study^[35] reported the fair and high knowledge of screening, respectively.

Attitude to breast cancer screening methods

A total of 12 and 5 articles were reported the negative^[13,16,17,24-27,29,34-37] and positive^[12,20,30,38,39] attitudes of the respondents to screening methods of BC, respectively. The frequency of the respondent's answers was in neutral attitudes in an article.^[11]

The practice of breast cancer screening methods

A total of 16 articles reported the low practice of BSE in respondents (i.e., <50% of participants performed BSE although was not regular).^[13,16,17,21,23-26,32,34-36,38-41] The high practice of BSE was reported in five articles,^[22,27,28,30,32] and seven articles did not address the practice of BSE.^[11,13,34,39-42]

A total of 18 articles reported the low practice of mammograms.^[11-13,16,17,22-24,27-29,32-34,37-39,42] A total of 9 articles did not address the mammography practice,^[21,25,26,30,31,35,36,40,42] and an article reported proper practice of mammograms by participants.^[20] All 14 articles that addressed the CBE screening in the participants reported the low practice of CBE.^[12,17,20,22-24,28,29,33,35,37,38,40,41]

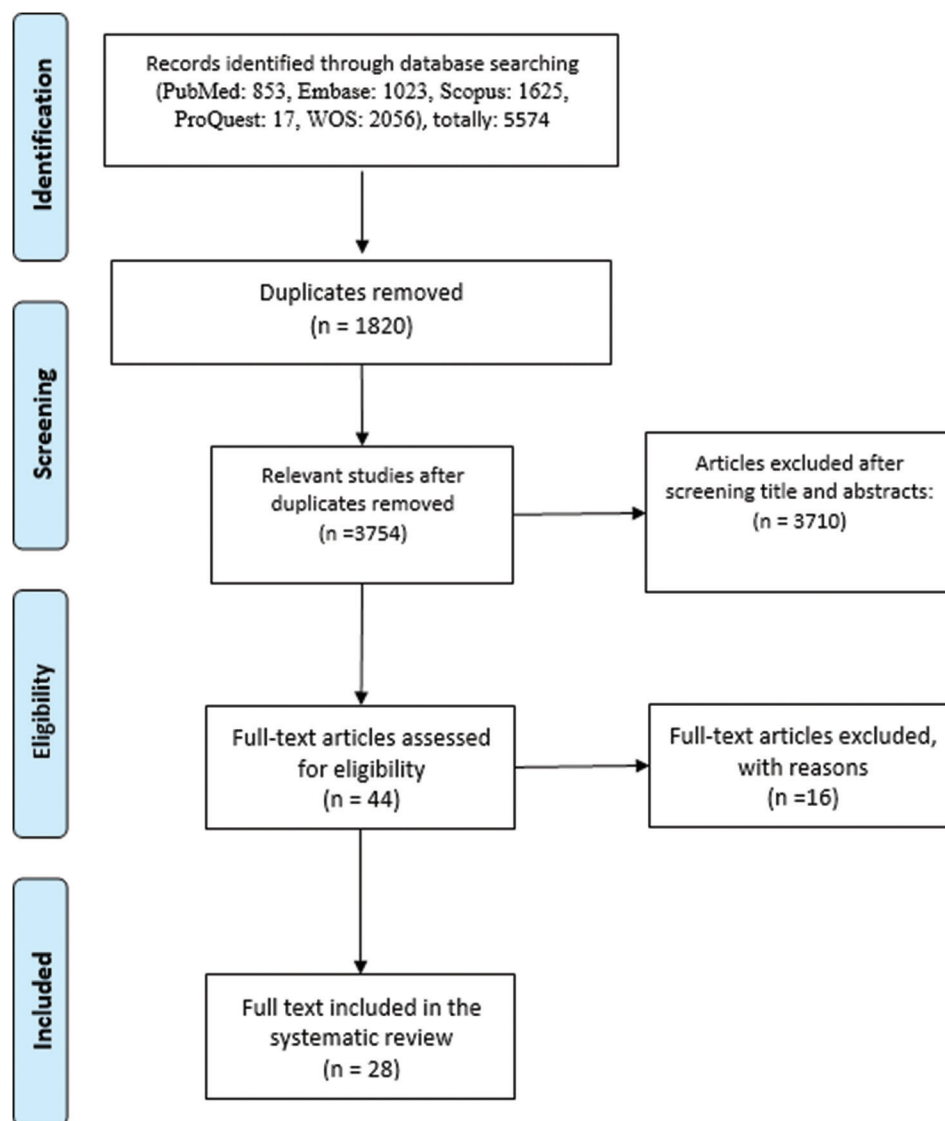


Figure 1: PRISMA flow diagram of the study selection

Discussion

Despite new technologies in the early detection of BC, an increase in the burden of the disease among women is seen in the countries. Therefore, in this study, we examined the knowledge and attitude, as well as the practice of women in BC screening methods to investigate one of the possible causes by a systematic review study. Obviously, by identifying the low knowledge and negative attitude as the reason for the low practice of screening methods, policymakers can prioritize educational as well as cultural plans at the beginning or even in parallel with BC screening strategies that the finding of our study confirmed this. Overall, there was poor knowledge about BC, symptoms, risk factors, BC screening methods, and the starting age for BC screening methods in women in Northern Vietnam, Abu Dhabi, and rural South Africa.^[11,12,16] Lebanese

females in Beirut did not have proper knowledge of curability, although they had high knowledge about symptoms of BC.^[20] Mexican participants had high levels of knowledge that attributed to education plans about BC by the government and nongovernmental organizations.^[42]

The job environment and the level of education had an effect on the level of knowledge about screening. Educated women, as well as those working in the health sectors, had higher knowledge about screening than the others, being interested in clinical methods,^[31,42] although their practice was lower than expected.^[27] The knowledge of health care workers such as nurses was higher than the other categories of health workers about the risk factors of BC and mammography screening. The poor knowledge of female health workers in the study was attributed to the nonavailability of the facility, especially

Table 1: Characteristics and findings of selected KAP studies

Author/year	Country	Participants characteristics	Study instrument and questionnaire administration	Knowledge
Al Blooshi et al./2020 ^[1]	United Arab Emirates/Abu Dhabi region	383 women aged 40-65 years	A self-administered questionnaire	Knowledge about mammography was as follows High knowledge: 45.7% of respondent Fair knowledge: 48.8% of respondent Poor knowledge: 5.5% of respondent
Al-Mousa et al./2020 ^[3]	Jordan	1367 females 20 years and older	A self-administered questionnaire	There were fair knowledge regarding the symptoms for BC (44%) and its risk factors (53.7%) as well as mammography (76%)
Heena et al./2019 ^[27]	KSA	390 female health professionals (nurses, physicians, and allied health staff)	A self-administered questionnaire	There was poor knowledge on the screening methods as well as diagnosis of BC 93.2% of the sample size had heard about the mammography as the most clinical screening of BC
Toan et al./2019 ^[2]	Vietnam/Thanh Hoa	306 women between 20 to 49 years old	A closed questionnaire	Low-level knowledge about screening method of BC: 62.8% of respondent 57.5% had knowledge related to CBE, 42% and 40.1% had knowledge related to Breast ultrasound, and mammography, respectively. (=poor knowledge)
Alshahrani et al./2019 ^[33]	Saudi Arabia/ Najran	500 patients female attended primary health care centers	A self-administered questionnaire	54.4%, 56.8%, 90.4%, 83.8% of respondents had low level knowledge of BC, BSE, mammogram, and CBE, respectively 19% of respondents had a high knowledge of BSE, 10.2% respondents had moderate knowledge of BC and 1.6% and 4.8% respondent for a mammogram, and clinical screening, respectively Poor knowledge Participants received the score 55.5±17.1% of knowledge of BC screening (=fair knowledge)
Asmar et al./2018 ^[20]	Lebanon/Beirut	371 females with no previous or current diagnosis of BC	A structured questionnaire	35.8% of women up to 50 and 49.3% of women over 50 years old had inappropriate knowledge about screening (=poor knowledge)
de Oliveira et al./2018 ^[4]	Brazil	243 rural woman between 35 to 69 years old that attending in a primary health center	A self-administered questionnaire	High knowledge about BC: 61.8%
Rawashdeh et al./2018 ^[28]	Jordan	72 radiologists and radiographers	A questionnaire with 26 questions	81% of women did not have any knowledge about BC (poor knowledge)
Siddharth et al./2016 ^[25]	India	360 consecutive rural women and their female relatives attending a teaching hospital	A self-administered questionnaire	
lurigh et al./2016 ^[26]	Iran/Mazandaran	3044 females in rural health-medical centers (≥20 years old)	A structured questionnaire	Overall, 73.5% of respondent had poor knowledge of BC screening methods
Ramathuba et al./2015 ^[26]	South African	150 rural household's women between 30-65 years	A closed-ended questionnaire	Overall, poor knowledge about BC, symptoms, risk factors, and BC screening methods. (Just 5.3% of the samples had heard about screening methods. About 2.6%, 2% and 0.6% of samples knew of CBE, BSE, and mammography, respectively)
Kotepui et al./2015 ^[22]	Thailand	217 female staff at the Walailak University	A self-administered questionnaire	Knowledge about screening methods of BC was as follows High knowledge: 35% of respondent Fair knowledge: 57.6% of respondent Poor knowledge: 7.4% of respondent
Othman et al./2015 ^[23]	Jordan	1549 adult females older than 18	A structured questionnaire	<40% of the sample size had moderate knowledge about clinical and non-clinical methods of screening (=poor knowledge)
Sarwar et al./2015 ^[17]	Pakistan/Lahore	1184 women aged over 18 years	A self-administered questionnaire	The mean score of knowledge about screening methods was 12.7±5.0 which revealed poor knowledge

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Table 1: Contd...

Author/year	Country	Participants characteristics	Study instrument and questionnaire administration	Knowledge
Behbahani 2014 ^[36]	Iran/Sanandaj	307 women aged 17 to 69 years that refer to public health centers	A self-administered questionnaire	Overall, just 15.6% of the participants had good knowledge about screening methods, although more than 60% of respondents had good knowledge about BC (=poor knowledge)
Pengpid and Peltzer 2014 ^[21]	Countries across Africa, Americas, and Asia	10,810 undergraduate of 25 universities in 24 countries (between 16-30 years old)	A self-administered questionnaire	50.4% of the sample size knew about BSE (=fair knowledge)
Gosein et al./2014 ^[35]	Trinidadian	314 women aged 40 and over at a general hospital	A self-administered questionnaires	64.6% of respondents knew that by mammograms a nonpalpable lump could be detected 89.8% of respondents knew that effective mammograms need to regular intervals 43.6% of participants knew that mammography was not always successful in diagnosing BC. (=fair knowledge)
Ei Mhamdi et al./2013 ^[38]	Tunisia/Monastir	900 women older than 25 years old in 15 health centers who had not history of BC	A structured questionnaire	Overall, 63.2% of the sample size had poor knowledge about BC and the screening methods (=poor knowledge)
Banegas et al./2012 ^[42]	Four U.S. Mexico border communities	265 women older than 40 years from health centers	An interviewer-administered questionnaire	>50% of Mexican women and about 45.2% of U.S. Latinas had a high knowledge of BC screening methods. (=overall poor knowledge)
Doshi et al./2012 ^[23]	India/Hyderabad City	203 dental female students at Panineeya Institute of Dental Sciences	A self-administered pretested close-ended questionnaire	On average, 74% of the sample size had poor knowledge about screening methods of BC
Akpınar et al./2011 ^[30]	Turkey/Çorum Province	444 professional females in a health care system	A self-administered questionnaire	<15% of female professionals knew about the prevalence of BC (=poor knowledge)
Khokher et al./2011 ^[40]	Pakistan/Lahore	1155 women in educational institutions	A multiple-choice questionnaire	Overall, 27%, 14%, and 59% of respondents had "good," "poor," and "fair" knowledge scores about cancer of the breast (=poor knowledge)
Akhibe and Ornuemu/2009 ^[24]	Nigeria	393 female health workers in health institutions (nurses, medical doctors, pharmacists radiographers, and laboratory scientists)	A self-administered questionnaire	Knowledge about mammography High knowledge: 23.7% of respondent Fair knowledge: 40.4% of respondent Poor knowledge: 35.9% of respondent
Avis-Williams et al./2009 ^[34]	Africa/Mississippi	58 women older than 40	Open-ended questions	Just 45.5% of respondents had knowledge about BSE (=overall poor knowledge) There were limited knowledge of BC risk factors, early detection, guidelines on screening, and treatment effectiveness in the focus group participants There were more aware of mammography and the BSE than the CBE >90% of respondents were knowledgeable about BC as well as BSE (92%), and mammograms (96%)
Kumar et al./2009 ^[31]	India/Karachi	341 consultants, residents, interns, nurses and medical students at a university hospital	A self-administered questionnaire	There was poor knowledge about BC and fair knowledge of screening methods (less than 40% of respondents knew about BSE, CBE, and mammogram, on average)
Saint-Germain and Longman/1993 ^[39]	Tucson	409 Hispanic and 138 Anglo women between 50 and 98	A self-administered questionnaire (face-to-face interview)	There were poor knowledge about BC (symptoms and risk factors) as well as its screening methods
Pham and McPhee/1992 ^[37]	Vietnam	107 randomly selected adult women in San Francisco	A structured questionnaire	This study did not address the knowledge of BC and screening methods as well
Perucci et al./1990 ^[41]	Rome	793 random sample of women between 18 and 64 years old	A self-administered questionnaire	

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6 **Table 1: Contd...**

Author/year	Attitudes	Practices	Main findings with regard to KAB	Quality assessment
Al Blooshi et al./2020 ⁽¹¹⁾	Attitude about mammography was as follows Positive attitudes: 26.9% of respondent Neutral attitudes: 56.9% of respondent Negative attitudes: 16.2% of respondent	Good practices (obtained mammograms): 47% of respondent Low practices: 53% of respondent	To improve the knowledge about screening using social media, public service campaigns and primary care were recommended. Free mammography can be effective in encouraging low-income women to have screening methods	79.55*
Al-Mousa et al./2020 ⁽¹³⁾	There were negative attitude about mammography (only 40.60% of respondents accepted the need for mammography)	Only 17.2% of respondents have had a mammography before the study (low mammography practice)	Awareness for BC as well as screening methods was needed. The availability of female healthcare providers can help women's attendance for screening methods, especially mammography	90.91*
Heena et al./2019 ⁽²⁷⁾	There were negative attitudes about screening methods (<10% of participants believed that BC can be prevented. 53.4% of the respondent did not believe in the effectiveness of BSE	Practicing BSE: 75% of participants Practicing mammography: 18.7% of participants	To improve the knowledge and positive attitude of female health staff about the screen of BC, active educational courses were needed.	88.64*
Toan et al./2019 ⁽¹²⁾	Positive attitude about screening: 61.1% of respondent	77.7% of participants had a bad practice for screening About 13.8%, 14.6% and 10.1 sample size had BSE, breast ultrasound, and mammography, respectively	Policymakers should prioritize ethnic minorities for planning of BCED intervention	88.64*
Alshahrani et al./2019 ⁽³³⁾	This study did not address attitudes	Overall, participants had a bad practice of screening 35% of patients performed BSE, 15% and 19.8% of them received mammograms and clinical screening for preventing BC, respectively	To enhance the screening for BC, healthcare providers should have more efforts, especially for using primary health care for early diagnosis	72.73**
Asmar et al./2018 ⁽²⁰⁾	Participants received the score 71.9±8.3% for the positive attitude of BC screening (positive attitude)	Participants received the score 45.7±42.3%, 77.9±36.5%, and 29.1±45.5% (of 100 points) for BSE, mammography and clinical screening, respectively	The curability of BC should be educated and the barriers of screening methods should be removed	86.36*
de Oliveira et al./2018 ⁽²⁴⁾	25.7% of women up to 50 and 33.6% of women over 50 years old had inappropriate attitudes about screening (=negative attitude)	37.9%, 49%, and 58% of participants had SBE, CBE, and mammogram, respectively (=low practice)	Rural women did not have basic knowledge about screening methods of BC	81.82*
Rawashdeh et al./2018 ⁽²⁸⁾	This study did not address attitudes	BSE, CBE, and mammography were performed by 65.7%, 28.7%, and 15.1% of participants, respectively	Radiologists were aware of BC screening benefits. Although they recommended BSE and CBE, did not perform themselves	81.82*
Siddharth et al./2016 ⁽²⁵⁾	All of the sample size thought that only physicians could diagnose BC (=negative attitude)	None of the participants did not perform BSE (=low practice)	The impact of screening of BC for early diagnosis and reducing the burden of disease should be explained for females in communities	77.27*
Iurigh et al./2016 ⁽²⁶⁾	Only 19.2% of sample size agreed with BSE, while 48% of them emphasized on the importance of time for effective treatment. (=negative attitude)	Just 21.1% of the sample size performed BSE, monthly (=low practice)	Training courses for screening methods of BC were recommended	77.27*

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Author/year	Attitudes	Practices	Main findings with regard to KAB	Quality assessment
Ramathuba et al./2015 ^[6]	<50% of females agreed with the important role of screening in the treatment of BC (=negative knowledge)	Just 6.3% of samples performed one of the screening methods in their lives (=low practice)	To prompt the knowledge of women about screening, the community-based intervention was suggested	86.36*
Kotepui et al./2015 ^[22]	This study did not address attitudes	About, 79% of the sample size performed BSE while 48.4% of them had received a clinical screening method	Knowledge about the screening methods should be improved, especially for women with low educational and income level	79.55*
Othman et al./2015 ^[23]	This study did not address attitudes	Almost 50%, 28%, and 7% of the sample size performed BSE, CBE, and mammography screening, respectively (=low practice)	Women should educate that performed screening method even without any apparent symptoms in breasts	81.82*
Sarwar et al./2015 ^[7]	76.8% of females believed on assessing the breast lump by a physician and 26.2% of them did not believe in routine screening until any problem occurred (=negative attitude)	>90% of participants did not perform BSE, CBE, and mammogram (11.6% of samples had more a year since last BSE; 10.4% and 1.8% of them had BSE as a routine check-up and when they had breast problems, respectively) (=low practice)	Serious efforts regarding clinical as well as nonclinical screening methods of BC for awareness of the general population is needed	75.00*
Behbahani 2014 ^[36]	55% of respondents had poor attitudes about screening method (=negative knowledge)	Although 47.4% of females underwent BSE, they did not perform on as a monthly basis (=low practice)	Educational coursed for clinical and non-clinical BC screening methods was needed for all females, especially young ones	70.45**
Pengpid and Peltzer 2014 ^[21]	This study did not address attitudes	>50% of the sample size did not perform BSE in the past year, while 21.3% and 10.3% had 1-2 times and 3-10 times, respectively. Only 9.1% of participants performed BSE per month. (=low practice)	Female university students had a poor practice of BSE and their knowledge about screening methods especially BC should be prompted	68.18**
Gosein et al./2014 ^[35]	Overall, participants had a negative attitude about screening methods (50%, 39.5%, and 62.4% of the sample size were concerned about pain or uneasiness during the mammogram, radiation, and cancer detection, respectively)	67.8% of respondents performed SBE while just 35.4% of them performed monthly 65.6% of respondents had a CBE at some point. (=low practice)	Misconceptions and gaps in knowledge, especially among illiterate women, are common to mammography. Information about pain perception and patient satisfaction can be effective in encouraging women to have a mammogram	84.09*
El Mhamdi et al./2013 ^[38]	Overall, 85% of women had positive attitudes for the screening methods	Only, 14.3% of women performed screening methods (=low practice)	The education program is needed to prompt women's adherence for screening methods	77.27*
Banegas et al./2012 ^[42]	A significant proportion of U.S. Latinas believed that BC is more likely than Mexican women	U.S. Latinas performed clinical and nonclinical screening methods more than Mexican women	Increasing access to and emphasizing the need for screening programs can be effective in improving screening practices in the U.S and Mexican women	81.82*
Doshi et al./2012 ^[29]	On average, 94% of second-year students had negative attitudes about screening methods	On average, 86% of female dental students had a poor practice of cancer screening of breast	Educational programs were needed to create knowledge and practice of screening methods of BC.	75.00*
Akpınar et al./2011 ^[30]	98.4% of female professionals were believed that BSE was a helpful method for recognizing the breast lumps (=positive attitude)	Although 81.3% of the sample size performed BSE, it has been regularly in doctors compared with nurses/midwives (=good practice)	Female health personnel need in-service training programs	79.55*
Khokher et al./2011 ^[40]	This study did not address attitudes	>50% of older females and >90% of young women did not undergo CBE (=low practice)	Improving women's knowledge using TV commercials as well as educational institutions can be an effective solution	75*

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8 **Table 1: Contd...**

Author/year	Attitudes	Practices	Main findings with regard to KAB	Quality assessment
Akhigbe and Omuemu/2009 ^[32]	This study did not address attitudes	77.6% of respondents perform BSE. Only 3.1% of female who was older than 40 performed mammography as routine annual screening (=low practice)	Regular update courses should be managed for teaching about BC and its screening methods for female health workers	79.55*
Avis-Williams et al./2009 ^[34]	Participants had negative perceptions of screening as well as clinical trial participation	Although mammograms were performed, they were not regular, especially among women aged 40-49 and those living in rural areas (=low practice)	Identifying new health education strategies were recommended	56.82**
Kumar et al./2009 ^[31]	This study did not address attitude screening methods	There were low practice of BSE in female responding	The proper time for BSE should be educated women	75**
Saint-Germain and Longman/1993 ^[38]	There were positive attitude about the curability of BC	On average, 50% of respondents had a mammogram (=low practice)	Older women should be aware of the risk of BC as well as screening methods	70.45*
Pham and McPhee/1992 ^[37]	There were negative attitudes toward cancer control	There was a bad practice about BC screening methods (BSE, CBE, and mammogram)	Education, as well as screening programs, was recommended, especially for immigrants and low-income women	81.82*
Perucci et al./1990 ^[41]	This study did not address the attitude	31.9% of respondents had undergone one of the breast examinations that used an imaging technique at least once in their lifetime (=overall low practice)	Inappropriate screening patterns were related to the physician's recommendations	72.73**

*High quality, **Low quality. KSA=Kingdom of Saudi Arabia, BC=Breast cancer, BSE=Breast self-examination, CBE=Clinical breast examination, BCEED=Breast Cancer Early Detection

in many government health institutions.^[32] Radiologists were aware of BC screening benefits, although they had low practice.^[28] There was higher knowledge about the practice of BC screening methods in laboratory scientists, lecturers, and general officers rather than temporary employees.^[22]

The reign of life was negatively associated with knowledge.^[11] Rural women had a low level of knowledge about BC and screening methods.^[16,24-26]

Overall, media, doctors, and co-workers were factors causing women to take a measure,^[11,32,33,39,40] although they were not adequate. Despite the positive relationship between knowledge and practice,^[21,26,29] it was not enough for screening behaviors.^[12,37]

All shows that the knowledge did not cause to practice for screening methods, exactly which can be attributed to negative attitude about BC or being highly optimistic^[37] that they will not get BC or it is not dangerous if they do. Women should have perceived the risk of BC to have a follow-up behavior for screening.

Rural women had a negative attitude about screening methods.^[16,24-26] Many Jordanian women thought that mammograms were not needed if a previous CBE was performed.^[13] Pakistani females noted that routine examination of breasts was not necessary until any problem alarming.^[17] Some believed that BSE could not help prevent BC, and some noted that a physician or midwife should evaluate breast lumps and BSE is not a correct way^[11,17,23,26,36,42] and preferred clinical methods, especially ultrasound and mammography.^[12] Attitude is more important than knowledge because women by proper/high knowledge but with negative attitudes did not perform screening methods. The most important point is that any of the selected articles did not report routine follow-up for clinical screening methods.

Limitation and recommendation

Although it was the first study that was addressed the knowledge, attitude, and women's practice for BC screening methods, there were two limitations for the study. First, we could not consider non-English studies and the second one was focusing on KAP studies while there were a lot of associated factors with the performance of screening methods.

To recommendations, researchers can focus on the role of proper information and educational programs on the women' practice in BC screening. Besides that, given that knowledge and attitude, are not the only factors for performing the breast screening methods, cues to actions can be identified for future studies.

Conclusions

Women did not have proper knowledge about clinical screening methods, as well as the starting age and the interval to perform them. Although the screening practice did not depend on knowledge alone, a high level of knowledge could lead to a positive attitude and high practice. Managing the continuous educational programs for BC and screening methods were recommended.

Ethics approval and consent to participate

The study protocol was approved by the Ethics Committee of Iran University of Medical Sciences (Ethical Code. IR. IUMS. REC.1398.1051). Consent to participate is not applicable to the study.

Availability of data and materials

All data generated or analyzed during this study are included in this published article.

Acknowledgments

This study was part of a Ph. D. thesis that is supported by the Iran University of Medical Sciences (grant No: IUMS/SHMIS-98-4-37-16709).

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Appendix 1

Search strategies
<p>PubMed:</p> <p>("Breast Neoplasm"[MH] OR "Breast Neoplasm"[TIAB] OR "Breast Tumors"[TIAB] OR "Breast Tumor"[TIAB] OR "Breast Cancer"[TIAB] OR "Mammary Cancer"[TIAB] OR "Mammary Cancers"[TIAB] OR "Malignant Neoplasm of Breast"[TIAB] OR "Breast Malignant Neoplasm"[TIAB] OR "Breast Malignant Neoplasms"[TIAB] OR "Malignant Tumor of Breast"[TIAB] OR "Breast Malignant Tumor"[TIAB] OR "Breast Malignant Tumors"[TIAB] OR "Cancer of Breast"[TIAB] OR "Cancer of the Breast"[TIAB]) AND ("Early Detection of Cancer"[MH] OR "Cancer Early Detection"[TIAB] OR "Cancer Screening"[TIAB] OR "Cancer Screening Tests"[TIAB] OR "Cancer Screening Test"[TIAB] OR "Early Diagnosis of Cancer" [TIAB] OR "Cancer Early Diagnosis" [TIAB]) AND (Knowledge[TIAB] OR Attitude[TIAB] OR "KAP"[TIAB] Preference[TIAB] OR Practice[TIAB])</p>
<p>Embase :</p> <p>('Breast Neoplasm':ti,ab OR 'Breast Neoplasm':ti,ab OR 'Breast Tumors':ti,ab OR 'Breast Tumor':ti,ab OR 'Breast Cancer':ti,ab OR 'Mammary Cancer':ti,ab OR 'Mammary Cancers':ti,ab OR 'Malignant Neoplasm of Breast':ti,ab OR 'Breast Malignant Neoplasm':ti,ab OR 'Breast Malignant Neoplasms:ti,ab' OR 'Malignant Tumor of Breast':ti,ab OR 'Breast Malignant Tumor':ti,ab OR 'Breast Malignant Tumors':ti,ab OR 'Cancer of Breast':ti,ab OR 'Cancer of the Breast':ti,ab) AND ('Early Detection of Cancer' OR 'Cancer Early Detection' OR 'Cancer Screening' OR 'Cancer Screening Tests' OR 'Cancer Screening Test' OR 'Early Diagnosis of Cancer' OR 'Cancer Early Diagnosis') AND (Knowledge:ti,ab AND Attitude:ti,ab AND 'KAP':ti,ab OR Preference:ti,ab OR Practice:ti,ab)</p>
<p>SCOPUS</p> <p>TITLE-ABS-KEY ("Breast Neoplasm" OR "Breast Neoplasm" OR "Breast Tumors" OR "Breast Tumor" OR "Breast Cancer" OR "Mammary Cancer" OR "Mammary Cancers" OR "Malignant Neoplasm of Breast" OR "Breast Malignant Neoplasm" OR "Breast Malignant Neoplasms" OR "Malignant Tumor of Breast" OR "Breast Malignant Tumor" OR "Breast Malignant Tumors" OR "Cancer of Breast" OR "Cancer of the Breast") AND TITLE-ABS-KEY ("Early Detection of Cancer" OR "Cancer Early Detection" OR "Cancer Screening" OR "Cancer Screening Tests" OR "Cancer Screening Test" OR "Early Diagnosis of Cancer" OR "Cancer Early Diagnosis") AND TITLE-ABS-KEY (Knowledge AND Attitude OR "KAP" OR Preference OR Practice)</p>
<p>PROQUEST</p> <p>AB, TI("Breast Neoplasm" OR "Breast Neoplasm" OR "Breast Tumors" OR "Breast Tumor" OR "Breast Cancer" OR "Mammary Cancer" OR "Mammary Cancers" OR "Malignant Neoplasm of Breast" OR "Breast Malignant Neoplasm" OR "Breast Malignant</p>