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Systematic Review: Barriers to Breast Cancer Screening in Arab Countries

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ABSTRACT:

Breast cancer (BC) is the most common type of cancer among women in the Arab World, which leads to high mortality rates and the spread of diseases throughout Arab countries. There are many barriers that prevent women from undergoing BC screening. Therefore, the purpose of this systematic review was to understand and identify the various barriers to BCS among women living in the Arab world. This systematic review was conducted based on research papers obtained from the following databases: PubMed, Google Scholar, and Science Direct. Only studies in English Language were chosen. Which were conducted in the Arab World, published from 2012 to 2022, and discussed barriers from women's perspectives. The articles included in this review were 3942 initial articles, 953 duplicate articles were excluded. The initial search results yielded about 2989 studies related to barriers that prevent women from having BCS. The articles that did not meet the criteria were excluded and this reduced the list to 106 articles. These articles were summarized their results and analyzed and were classified as 94% high quality and 6% medium. Barriers identified were fear and anxiety, lack of awareness, preoccupation, idea of shame, lack of family support, professional attitude, religious beliefs, and lack of health services. In conclusion, these obstacles played a major role in the spread of BC among Arab women, and therefore identifying and evaluating them helps to address and reduce them. Also, it is possible to improve and develop screening models and increase the number of women participating in BCS. Based on this, we recommend implementing awareness and educational plans for women about the importance of early detection of BC.

Introduction

BC is the most common cancer affecting women worldwide. According to the World Health Organization and several recent studies, about 2.3 million women were diagnosed with BC [1-3]. Also, BC is a general health problem in developed and developing countries [4]. BC has spread until it represents about 11.7% of all cancers diagnosed [1,5]. Although its prevalence in developed countries is higher than in developing countries, the mortality rate in developing countries was high, representing 54% annually [1,4,6]. This results from the lack of efforts in developing countries, changes in risk factors, inadequate access to BC screening, deficiency of treatment, and the limited work for early detection of BC [4,7]. In addition, the highest cancer mortality rate in women is associated with BC [5]. BC deaths have increased in low- and middle-income countries because women are screened at an advanced stage and thus have lower cure rates and higher mortality rates [2,8]. Moreover, understanding factors that may increase the risk of women suffering from BC helps to develop

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strategies aimed at reducing the rates of infection with this disease, as well as the deaths associated with it [9]. Thus, these factors that increase the possibility of the risk of women suffering from BC are the variable lifestyle, smoking, aging, family history of breast cancer, genetic mutations, breast tissue density, late menopause, delayed age of the first pregnancy, taking menopausal hormone therapy, physical inactivity, and obesity [7,9,10].

The process of early diagnosis of BC is vitally important in order to reduce mortality rates related to BC, and it depends on BC screening programs, which are the most important element of the early detection process for BC [3,9]. In addition to that, this screening is recommended by many countries around the world through professional guidelines and periodically organized screening programs [3]. Many previous studies have indicated that there are different screening modalities for the early detection of BC, and the most important of these modalities are breast self-examination, Clinical Breast Examination (CBE), sonography, and mammography (MAM) [3,9-12]. In addition, MAM is considered the gold standard for detecting BC early and reducing mortality among women. However, the benefits of this tool are dependent on some factors like the skills of the technician and proficiency of the radiologist reading the mammogram [11,13]. However, recent studies have reported that early detection and diagnosis of BC have improved the level of prognosis for women patients and reduced BC risks and mortality rates [14-16]. Therefore, the participation of women in the early detection process and stakeholders is crucial to maintaining health and survival.

Although health conditions improved and mortality rates decreased after women participated in early BC detection activities, Arab women's participation rates in breast cancer screening were low [12,17]. This is due to many barriers that affect or prevent women in Arab countries from participating in breast cancer screening, and several recent studies have indicated this result [9,17-19]. Previous studies have indicated the main barriers that affect the practice of BC screening include psychological (belief that screening is not necessary, fear and anxiety about the results, indifference to early detection, self-confidence, fear of pain, embarrassment), social (lack of awareness and knowledge, lack of support social, lack of motivation, woman's age), and environmental (time management, being busy and working most of the time, lack of health facilities, not knowing the places designated for screening, long medical appointments), in addition to economic and geographical barriers [1,9,12,17-22].

Recently, a number of researchers have been interested in studying the barriers to BC screening that women face in Arab countries [1,9,12,17,19,21,22]. Still, the literature related to this topic is insufficient and does not include all Arab countries. Therefore, this systematic review was conducted with the main objective of identifying and evaluating barriers to BC screening among women in Arab countries. In addition, there are sub-objectives of this review are: 1) to obtain a summary and overview of the findings of the literature regarding the barriers to BC screening among Arab women; 2) to reveal the most critical barriers that affect women's commitment to BC screening; 3) obtain an overview of the barriers and help develop solutions to suboptimal screening rates among women living in the Arab world.

Materials and Methods

Methodology

We conducted this systematic review of the literature from 2012 to 2021 in order to understand and clarify the various barriers that directly affect BC screening among women in Arab countries. Our current review was based on PRISMA-S, which is used in systematic reviews and describes the processes and steps of literature searches [23]. In this review, we focused on research published from 2012 onwards for the clarity of information and results, and the methodology helped to obtain a general and in-depth view of the barriers to BC screening in Arab countries. Also, the methodology helped us to determine these barriers, and understand and determine gaps and shortcomings in the research.

Search Strategy

A search was conducted for literature published between 2012 and 2021 and the relevant literature was selected from it through a systematic method. This systematic search of literature related to barriers to BC screening was conducted by searching the electronic databases PubMed, Google Scholar, and Science Direct. Literature with duplicate citations was removed and the

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results were organized, explaining the justifications for exclusion. All published papers with scientific impact and in English were retrieved, which includes barriers to BC screening in Arab countries (Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Sudan, Syria, the United Arab Emirates, and Yemen). The relevant keywords that were used individually or together were: barriers, breast cancer screening, Arab world, Arab, Gulf, early detection, breast cancer, knowledge, Arab women, breast self-examination, mammography, and breast clinical examination. In addition, these terms were searched with each Arab country separately.

Selection and Determination of Required Publications

The initial search results in electronic databases yielded a total of 3942 articles. Of these published articles, 953 were duplicates. A total of 2989 articles related to barriers to BC screening were retrieved, and 2605 articles were irrelevant. The 277 articles that did not meet the inclusion criteria were excluded for the following reasons: 161 were not related to barriers to screening, 45 were published before 2012, 37 were wrong in population/country, 15 were not barriers from women's perspective, 15 had wrong study design (systematic review), and two studies in Arabic, which reduced the list to 106 eligible articles and were included in this study. The study selection process was described using the PRISMA meta-analysis chart [24] shown in Figure 1.

Selection Criteria

There are a number of inclusion criteria that were relied upon to select articles published and include them in our systematic review during a specific time period and in Arab countries, in addition to targeting Arab women. There are also some exclusion criteria where all articles that were conducted in developed countries, or that did not meet the criteria, were excluded. The inclusion and exclusion criteria are summarized in Table 1.

Quality Assessment

The MMAT tool was used to assess quality [25] (Appendix 1). The results showed that most studies were of high quality, and six studies were of moderate quality.

Table 1: Shows the inclusion and exclusion criteria for articles included in this systematic review.

Inclusion criteria	**Exclusion criteria**
Articles published during the period from 2012 to 2021and related to barriers to BC screening	Focus only on articles related to breast cancer
Published articles written in the English Language	Published articles written in a language other than English, such as Arabic
The population is women living in Arab countries	The population is women from Arab countries living in developed countries
Quality articles include quality information published in peer-reviewed journals	Weak articles containing incomplete information published in non-referenced journals
Articles related to barriers to BC screening	Irrelevant articles to studying the barriers to BC screening
Intervention for BC screening was done by breast self-examination (BSE), mammography, and clinical breast examination (CBE)	Intervention for BC screening was done by methods that have not been proven to be used such as thermal screening

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Comparison was not specified as an inclusion criterion as articles with and without the comparison group were included	Comparison was not specified as an exclusion criterion
Articles conducted in Arab countries or meet the criteria	Articles conducted in developed or non-Arab countries, or do not meet the criteria
Articles that reported their results about the barriers to BC screening for Arab women	Articles in which results were not reported on any barriers to BC screening for Arab women

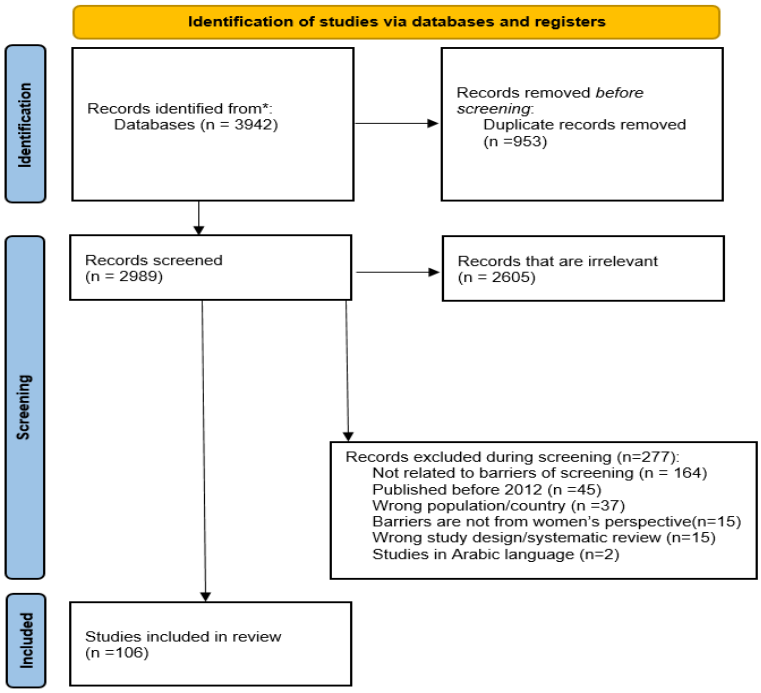

Figure 1: Illustrates the study selection process using the PRISMA meta-analysis chart.

Results and Discussion

Results

Search Results

Search results in PubMed, Google Scholar, and Science Direct yielded many articles related to breast cancer. After excluding duplicate and irrelevant articles from among these articles, the number of articles that were included in this review was 106. The evaluation and quality parameters of the articles included in this review were comprehensively conducted and the results were presented in Table 1. The 106 included articles have been classified as 94% were of high quality, 6% were of medium quality as shown in Appendix 1, and none of the selected articles were classified as low quality. In addition, the articles were diverse based on the methods they relied on to conduct the studies. Where 62 articles relied on the qualitative analysis method, 38 articles used the quantitative analysis method, while 6 articles used the mixed analysis method. Of the 106 articles, 39 articles (37%) were conducted in Saudi Arabia, 17 articles (16%) in Egypt, 11 articles (10%) in Palestine, 10 articles (9%) in Iraq, 9 articles (9%) in Jordan, four (4%) in United Arab Emirates, four (4%) in Lebanon, three (3%) in Kuwait, two (2%) in Morocco, two (2%) in Oman, and one (1%) in Qatar, one articles (1%) in Sudan, one

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articles (1%) in Syria, one articles (1%) in Libya, and one articles (1%) in Yemen as shown in Figure 2.

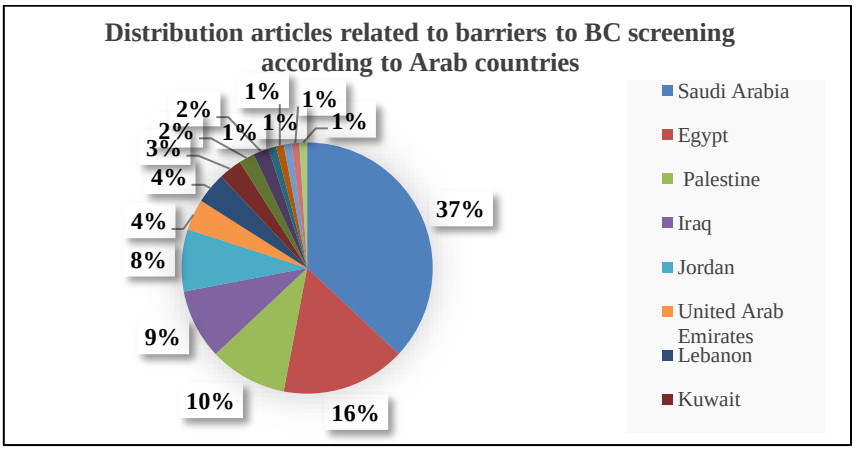

Figure 2: Represents the percentage distribution of articles related to barriers to BC screening according to Arab countries.

Barriers Preventing Screening among Women Living in Arab Countries

In terms of attention, focus, and disclosure of the barriers facing women related to undergoing BC screening, there are many articles included in the review that focus on the most important barriers that prevent women in Arab countries from undergoing BC screening. Consequently, the results of the analysis of these articles showed that there is a group of common barriers among women in Arab countries, as the results of 54 articles (51%) indicated that fear and anxiety are among the most common barriers among women, and 50 articles (47%) concluded that lack of information, knowledge, and awareness about BC and BC screening, 35 articles (33%) indicated in their results that Being busy, having no time and lack of desire were barriers, 34 articles (32%) referred to the idea of shame, 9 articles (9%) indicated lack of family support, and 8 articles (8%) referred to the professionals' attitude, 8 articles (8%) referred to religious belief, and finally 21 articles (20%) mentioned in their results that one of the barriers to BC screening is the accessibility to BC screening. All of these results are shown in Table 2 and Figure 3. We have shown what the findings indicate in the review articles regarding the common barriers to BC screening among women in Arab countries for each barrier in detail below.

Table 2: Shows the number and percentage distribution of the barriers to BC screening according to articles of the systematic review.

Sr.No.	Barrier to BC screening	Number of Articles	Percentage of Articles
1	Fear and anxiety	54	51%
2	Lack of information, knowledge, and awareness about BC and BC screening	50	47%
3	Being busy, having no time and lack of desire	35	33%
4	Idea of shame	34	32%

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5	Lack of family support	9	9%
6	Professionals' attitude	8	8%
7	Religious belief	8	8%
8	Accessibility to BC screening	21	20%

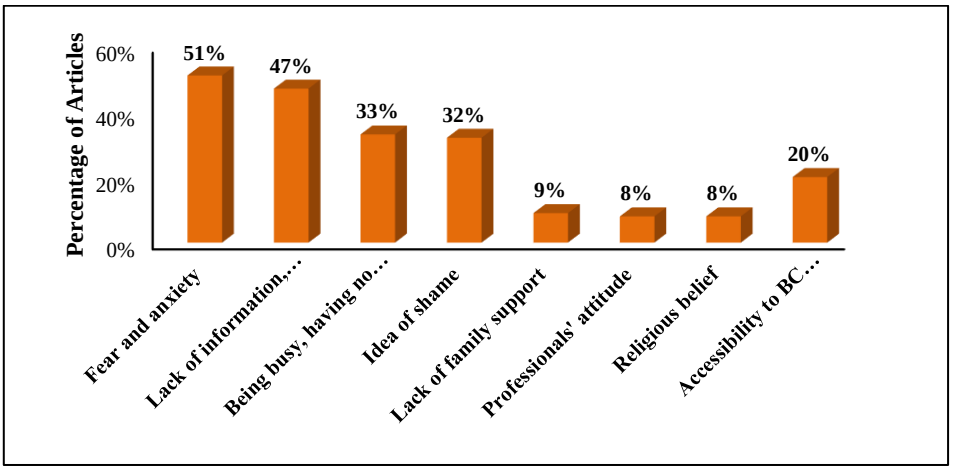

Figure 3: Percentage distribution of the barriers to BC screening according to articles of systematic review.

Fear and Anxiety

Fear is the most common reason that prevents women from undergoing BC screening, whether breast self-examination, clinical examination, or mammogram. Since cancer is associated with death and disability in people's minds [26], the results of most articles have found that fear is one of the most important barriers to BC screening [26-34]. In addition, the fear of being diagnosed with cancer, the fear of BC, the discovery of abnormalities, and the fear of undergoing screening are among the most important barriers that prevent women from practicing screening [7,18,27,35-59]. Even in countries where screening is completely free, such as Saudi Arabia, studies conducted in this country reported that fear of BC is the main barrier to accessing BC screening services [28,60,61], while a article reported in its results that about 69% of women in Saudi Arabia that fear of BC was a major barrier to mammogram testing [60]. Another article also reported that women are afraid to even think about BC [61].

Moreover, some women believe that they can't face BC, and they are afraid of being examined by a doctor [62], in addition to having a fear of radiation and X-rays emitted from mammograms [18,45,47,49,51,59 ,63-65]. Fear among women has been referred to in some articles as fear of misdiagnosis and lack of confidence in the result [18,59,66], as well as fear of cancer treatment [7,18,34]. All of these fears are considered barriers to undergoing BC screening. Most articles revealed that women reported that they have a fear of severe pain during the examination procedure, especially the mammogram, and this fear prevents them from practicing BC screening regularly [18,28,29,31,34,50,51,54,57,65-71], also a result of some women believing that screening by mammography and CBE causes pain [34,50,54,59,64-73]. Furthermore, there are other reasons why women fear undergoing cancer screening, including cultural beliefs represented by the fear of abandonment by the husband, divorce, and the fear of the husband marrying a second time if she is diagnosed with BC [74,75]. Among these reasons is that most women reported that they have a fear of losing one or both breasts if they are diagnosed with BC, and this fear is the result of women and society associating femininity with the presence of breasts [76,77].

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Lack of Information, Knowledge and Awareness about Screening and Breast Cancer

It has also been reported extensively in many articles that lack of knowledge and awareness has been identified as one of the important barriers to undergoing cancer screening generally and BC screening specifically. It has been indicated that the barriers that prevent women from practicing screening are a lack of knowledge about how to conduct BSE, or that they do not have sufficient knowledge and information about BC disease, or they lack of knowledge about the seriousness of BC disease and the importance of early its detection [29,30,36,41,42,44,51,56-58,68,70,78-94]. More specifically, the same barriers have been reported related to the lack of knowledge, information, and awareness that women face when undergoing CBE and mammogram [18,50,52,65,70,81,95-99], and ignorance of the importance of screening and early detection of BC [48,67,73,100]. In addition, there are other barriers that women face related to mammograms and CBE, such as a lack of information and knowledge about the places to go to do these examinations [34,69]. Many of the articles included in this review reported that the women participating in these articles had misconceptions and beliefs about BC and screening, as they had a belief that BC is not treatable [26,73,95,101], and some of them had the belief that if you do not feel with breast pain, it is not necessary to undergo screening [27,31,35,36,42,57,73,83,102], while there are women participants who do not believe in the importance of undergoing BC screening such as mammography [55,64,89]. These are some of the beliefs that are related to the barrier of lack of information, knowledge, and awareness that prevent women from undergoing BC screening.

Being Busy, having no Time and Lack of Desire

The results of the articles found that there is a relation between the main barriers mentioned previously and lack of time and lack of desire, where women mentioned in these articles that their failure to perform BC screening is related to several reasons, including not having enough time to do the screening or that it takes a long time, performing BC screening wastes time, and there is no time to conduct the screening due to being busy with various tasks [18,28,29,40,44,45,48,54,58,61,64-66,73,75,85,93,99,103-112]. Furthermore, the lack of desire was one of the barriers that prevented women in Arab countries from undergoing BC screening, which was that they did not have the desire or motivation to go for a mammogram [59,67,83], and had negative interest in practicing any type of BC screening [98]. Some women also reported that they did not care about BC screening procedures [84,86,110], and others reported that they forgot to do this screening and therefore did not undergo any BC screening [75,105,113].

Idea of Shame

The idea of shame is considered one of the ideas deeply rooted in the minds of Arabs, especially in matters related to women. Therefore, the idea of shame was one of the obstacles that women faced to undergoing BC screening, as they were ashamed of undergoing this screening, and they were also ashamed of BC [26,73,57]. There are articles in which women participants mentioned that they think they should not touch their breasts, do not like having them touched, or are ashamed to expose their breasts [28,36,42,43,67,75,90,91,105,114]. Several articles also indicated that embarrassment was the most obvious barrier reported by participating women, as they were embarrassed about undergoing BC screening with mammography or CBE [7,33,34,39,51,56,59,62,64-67,70,71,112,115,116]. This embarrassment among women was due to concerns about the doctor responsible for performing the examination being male [7,18,34,43,51,62,66], and this is also what may cause women to report discomfort and be inconvenient about undergoing the screening [108,117]. In addition, one of the reasons for embarrassment may be the lack of privacy in BC cancer screening centers [43,66,75,78,93].

Lack of Family Support

Lack of family support is an important barrier that discourages women from seeking breast health care. The lack of family support is represented by the lack of support from the surrounding environment [37,51,118], women being prevented by relatives or husbands from undergoing BC screening [109,119], or male relatives not consenting to women undergoing BC screening [34,70]. In addition, there are women who feel that they need to get their husbands' permission to undergo BC screening, and this hinders them from getting screening if their husbands do not agree [120].

Professionals' Attitude

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Women indicated in some articles that the lack of adherence to breast health-related screening represents a barrier to BC screening. The lack of adherence means that these procedures have not been recommended by professionals or by the Ministry of Health to increase commitment to the practice of BC screening [7,18, 29,38,57,73,96]. One article also reported that the lack of adherence means that women will not start BC screening except based on the advice given to them by doctors [42].

Religious Belief

Some articles in this review mentioned that religious beliefs are a barrier to women undergoing BC screening [37,43,51,56,77]. While some women link fatalism, spirituality, and the belief that their health is in the hands of Allah, and undergo BC screening, so this is considered another barrier to undergoing this screening related to religious beliefs [109,121,122].

Accessibility to BC Screening

Lack of access is one of the barriers that affect a woman's decision to undergo BC screening [51,57]. Accessibility to BC screening has different dimensions such as affordability, which means that the prices of screening-related services must meet women's income level and ability to pay [123]. The affordability of screenings was not always met since women in some articles reported that screening by mammogram or CBE was expensive and this was one of the reasons that prevented them from undergoing screening [18,37,45,54,66,70,103,108,111,124-129]. While some women indicated that their financial situation was also a barrier to undergoing screening [46,55,56,70,123]. Other barriers related to accessibility such as barriers related to cost and economic situation, which include difficulty obtaining sick leave from work [18,122] fear of losing financial support [50], and cost of service [64]. In addition, there is another dimension is accessibility, which means that the location of the screening is compatible with the women's residential locations [123]. Some of the barriers related to accessibility were the burden of transporting women to central treatment centers [122], lack of transportation, not knowing which institution performs mammography or unavailability of mammography [18,55,59,64], and distance from places of free mammography and difficulty of access [18,43].

Discussion

Conducting this review is important given the high mortality rates and high incidence rates of advanced BC in the Arab world compared to developed countries [130]. According to the results of the articles focused on, we found that BC screening in Arab countries is affected by barriers that prevent women from practicing screening, which are relatively different from the obstacles in non-Arab countries [3,4]. This may be due to cultural, social, environmental, and economic differences.

The results of the current systematic review found that there are eight barriers that women in Arab countries face in obtaining BC screening. Among these barriers, there were four barriers that were the most common and were indicated by the results of most of the articles included in the review: fear and anxiety, lack of information, knowledge and awareness about BC and BC screening, being busy and lack of desire, and the idea of shame, and this is consistent with the findings of the study by Srinath et al. [2]. While there are barriers mentioned in some articles: lack of family support, professionals' attitudes, religious beliefs, and accessibility to BC screening. This indicates that external barriers have a lesser impact on women's practice of BC screening, on the other hand, it indicates that there is interest on the part of specialists in some Arab countries to facilitate BC screening procedures.

In general, in all articles, in terms of the study area, the women involved, the method used to collect data, or the focus of the study, fear and lack of knowledge and awareness were identified as the most prevalent and important barriers in Arab countries. Women may hear about BC, but their knowledge and awareness of its causes, symptoms, and risks of contracting it are few and sometimes non-existent, especially in developing Arab countries [9]. Furthermore, women's knowledge and awareness about BC and its risks greatly help women go to health centers designated for BC screening and thus help them in the early detection and prevention of the disease.

According to the findings of the articles, fear and anxiety are among the most important barriers that prevent Arab women from undergoing BC screening. In order to reduce this fear, women must learn different interventions and measures that manage their fears and anxiety and help alleviate them [131]. It is also important for radiologists to educate women about the scan,

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especially before the procedure. In a study by Pai and Rebner, results showed that communication between radiologists reduced patients' anxiety [132]. Another way to reduce anxiety is to reduce waiting time and give immediate results for tests. Moreover, relaxation methods are useful in reducing anxiety and fear. So, there are some means and methods that reduce negative thoughts and anxiety, including meditation, and mindfulness, in addition to music, aromatherapy (using oil to change the patient's mood), massage therapy, and cognitive behavioral therapy [132].

The lack of knowledge and awareness was one of the most important barriers to BC screening from a woman's point of view, so it is important to educate women and increase awareness about BC screening. Therefore, women must follow methods and techniques to increase awareness and knowledge. Among these methods used to increase awareness and mentioned in the literature are health talks, radio and television interviews, and campaigns on social media [133-135]. In general, in Arab countries, health systems and screening centers must be developed to focus on implementing many educational programs and educational strategies with the aim of educating the community and increasing evidence-based knowledge about BC [2]. Accordingly, the level of women's commitment to undergoing the screening is improved. A review conducted by Naz et al. reported that educational interventions in various forms are among the most effective interventions in pushing women to change their behavior and beliefs about the importance of undergoing screening [136].

Being busy and lacking time was one of the barriers repeatedly mentioned in many studies to women's participation in preventive BC screening. This preoccupation may be the result of the different responsibilities that women bear at home or if they are employees in the workplace [137]. The role of the Arab woman in the home was an obstacle for her to go for screening because she did not find enough time to do so, as she had to do many tasks such as taking care of family members, housekeeping, taking care of children, and cooking. This is considered one of the obstacles that prevent women from seeing a doctor or undergoing screening.

Some articles mentioned that the idea of shame is one of the barriers facing Arab women to undergo BC screening. This may be the result of the idea of shame being a deeply gendered phenomenon in the Arab world, where women are the most affected gender. Shame is often taught to women from the time they are children [138]. The idea of shame was mentioned in a study conducted by Cohen et al., where participating Arab women living in Israel reported that breast cancer is a shameful thing that should be kept very secret [139]. Women in the Arab world also fear gossip and believe that a woman's ability to have a good marriage could be negatively affected if people learn that a woman has BC [140]. Also, the lack of a female doctor may hinder women from examining their breasts, because Arab countries are conservative societies, and women may feel embarrassed if a male doctor examines them [34]. Therefore, cultural aspects must be taken into consideration, especially in Arab countries, and most employees working in this field and performing CBE or mammography must be female [7].

Lack of family support is another reason why women do not participate in cancer screening procedures. The effect of social support on BC screening has been discussed in many studies. Katapodi et al. and Guan et al. reported in their study that social support for women is positively associated with their BC screening and the efficiency of the health information they receive [141,142]. Janssen et al. also reported that women who had infrequent contact with friends and family were less likely to participate in screening [143]. In addition, some women reported that not having someone to take care of their home was one of the barriers that prevented them from participating in screening procedures [143]. However, other studies did not find this association between social support and cancer screening as reported by Smalls et al. [144]. In this regard, the most important findings reached in the current review were that family support for women plays a pivotal role in their practice of BC screening, especially husband's support, and the absence or deficiency of marital support represents a major barrier for women to undergo to screening [2].

We found in the results of some review articles that women have reluctance or no commitment to go for BC screening unless the physicians recommend screening. This indicates that the physician's failure to recommend

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screening to women constitutes a barrier to them undergoing BC screening. This indicates the importance of the recommendation of professional physicians to screen women, as it represents the incentive and motive for performing the screening [2]. In addition, the attitude of some professionals represents another barrier to women undergoing BC screening. Thus, Grady et al. indicated in their study that physician behavior is of great importance in preventing BC, especially for older women, their results also showed that women are four times more likely to undergo screening if they are encouraged by their physician [145]. Also, women were more likely to participate in BC screening when they were registered with experienced practitioners with a positive attitude toward screening while the opposite was true if they were registered with practitioners with a negative attitude [146]. This confirms the need to develop the level of medical education for professionals and physicians, especially specialists in the field of screening, to overcome their cognitive shortcomings regarding how to deal with women and remove barriers to undergoing BC screening in Arab countries. Moreover, it also emphasizes the need to study the barriers that prevent physicians from recommending screening. Physicians should therefore be aware of their vital role in motivating women to participate in screening [147].

Another important barrier noted is that women who are uninsured, underinsured, or of low socioeconomic status may be less likely to undergo screening [148]. It is therefore important for governments to prioritize screening and provide financial incentives to women undergoing screening [148]. Furthermore, cost is one of the most common barriers to BC screening especially in low-income women [149]. Also, an important finding noted by some articles is that access barriers such as lack of transportation were identified as a barrier to screening, and Castadli et al. noted that transportation was the most common barrier to completing BC screening in urban and rural women [150]. Therefore, we emphasize the importance of providing vehicles to transport women to and from the scheduled appointments for screening, as well as providing facilities for screening procedures at work sites for working women, or providing mobile mammography vehicles in the future to move around neighborhoods for screening.

Finally, the results of some of the articles included in the review confirmed that religious beliefs were a barrier for women to undergo screening. Furthermore, religious beliefs may act as a barrier or facilitator to BC screening. It was confirmed that religious belief is considered a barrier for women to undergo BC screening in a study conducted in North Carolina [151], a minority of women with religious beliefs believed that treatment was not important because only God could cure BC, and this dimension was called (religious intervention in place of treatment). While others believed that God worked through physicians to cure illness, this dimension was called (religious intervention with treatment). Women who believe in the first dimension will most likely delay BC screening and early detection. In order to increase screening in this population, physicians and clergy must work together [151].

Conclusion

The current systematic review concluded that while the lack of family support, professionals' attitudes, religious beliefs, and accessibility to BC screening were prominent and important barriers to BC screening faced by women in Arab countries, however, there are more common and important barriers that most articles referred to them. These are fear and anxiety, lack of information, knowledge, and awareness about BC and BC screening, being busy, having no time and lack of desire, and the idea of shame. All of these barriers had a significant impact on women in Arab countries when undergoing BC screening. The barrier of fear and anxiety about being diagnosed with BC, as well as the barrier of lack of knowledge about the causes and harms of BC and how to prevent it through early detection, were the biggest barriers that prevented women from going to screening centers and attention to performing a routine screening. To overcome all these barriers, we recommend that it is necessary to educate women and increase their knowledge about the importance of BC screening before undergoing it. In addition to reducing fear and anxiety by reducing waiting time, giving results immediately after the screening, advising women to practice relaxation techniques, and employing females to conduct the screening. The other barriers can also be overcome by increasing awareness among physicians about their vital role in motivating women to undergo screening and educating them to consider their health a

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first priority. In addition, encouraging physicians and clergy to work together to address issues of religion is one of the barriers to BC screening. Finally, we recommend that decision-makers and specialists provide free BC screening, especially in developing countries, and provide financial incentives to get women to undergo screening. Also, it is possible to improve and develop screening models and increase the number of women participating in BCS. Given the importance of topics related to BC and BC screening, also we recommend the necessity of conducting many recent studies on this topic, especially since there are Arab countries in which there are few these studies and others are rare.

Study limitation

One of the limitations to our study that it only included studies in English Language which may result in bias. However, this systematic review includes a large number of studies which strengthens the external validity(generalizability). We can for sure generalize the barriers in our study to barriers in other studies and other countries, as we covered in the discussion section.

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Not applicable.

Conflict of Interest

There are no conflicts of interest to declare.

References

1. Bakarman, M., Kalthoum, D., Salem, I.W., Alshuaibi, R.O., Almohammadi, T.A., Beser, R.A., Almuwallad, R.H., Alotaibi, L.A., Almohammadi, T. and Alotaibi, L., Barriers to Using Breast Cancer Screening Methods Among Adult Females in Jeddah, Saudi Arabia: A Cross-Sectional Study, *Cureus*, 2023, **15** https://doi.org/10.7759/cureus.41739
2. Srinath, A., van Merode, F., Rao, S.V. and Pavlova, M., Barriers to cervical cancer and breast cancer screening uptake in low-and middle-income countries: a systematic review, *Health policy and planning*, 2023, **38:**509 https://doi.org/10.1093/heapol/czac104
3. Ferreira, C.S., Rodrigues, J., Moreira, S., Ribeiro, F. and Longatto-Filho, A., Breast cancer screening adherence rates and barriers of implementation in ethnic, cultural and religious minorities: A systematic review, *Molecular and Clinical Oncology*, 2021, **15**:1 https://doi.org/10.3892/mco.2021.2301
4. Kaur, K., Jajoo, R., Naman, S., Kandwal, T., Brar, G.S., Garg, P., Bhullar, P.S. and Baldi, A., Identifying barriers to early diagnosis of breast cancer and perception of women in Malwa region of Punjab, India, *Global Health Journal*, 2023, **7**:34 https://doi.org/10.1016/j.glohj.2023.02.006
5. Sung, H., Ferlay, J., Siegel, R.L., Laversanne, M., Soerjomataram, I., Jemal, A. and Bray, F., Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries, *CA: a cancer journal for clinicians*, 2021, **71**:209 https://doi.org/10.3322/caac.21660
6. Shepardson, L.B. and Dean, L., August. Current controversies in breast cancer screening, In *Seminars in Oncology*, 2020, **47**:177, WB Saunders, https://doi.org/10.1053/j.seminoncol.2020.05.002
7. Al-Azri, M., Al-Rubaie, K., Al-Ghafri, S., Al-Hinai, M. and Panchatcharam, S.M., Barriers and attitudes toward breast cancer screening among Omani women, *Asian Pacific Journal of Cancer Prevention: APJCP*, 2020, **21:**1339 https://doi.org/10.31557/apjcp.2020.21.5.1339
8. Bellanger, M., Zeinomar, N., Tehranifar, P. and Terry, M.B., Are global breast cancer incidence and mortality patterns related to country-specific economic development and prevention strategies?, *Journal of global oncology*, 2018 https://doi.org/10.1200/JGO.17.00207
9. Alanazi, M.F., Thirunavukkarasu, A., Alrowily, M., Alaqel, N., Alaqel, A., Alruwaili, M., Alazmi, N.N.M., Alhassan, O., Aljarallah, M.F.M. and Altaymani, A.M., A Cross-Sectional Evaluation of Knowledge About Breast Cancer and Perceived Barriers to the Uptake of Mammogram Screening Among Northern Saudi Women: A Population-Based Study, *Breast Cancer: Targets and Therapy*, 2023, 451 https://doi.org/10.2147/BCTT.S414635
10. Łukasiewicz, S., Czeczelewski, M., Forma, A., Baj, J., Sitarz, R. and Stanisławek, A., Breast cancer—epidemiology, risk factors, classification, prognostic markers, and current treatment strategies—an updated review, *Cancers*, 2021, **13**:4287 https://doi.org/10.3390/cancers13174287

Journal of Chemical Health Risks

www.jchr.org

JCHR (2023) 13(3), 845-870 | ISSN:2251-6727

11.Azami-Aghdash, S., Ghojazadeh, M., Sheyklo, S.G., Daemi, A., Kolahdouzan, K., Mohseni, M. and Moosavi, A., Breast cancer screening barriers from the womans perspective: a meta-synthesis, *Asian Pacific Journal of Cancer Prevention*, 2015, **16**:3463 https://doi.org/10.7314/apjcp.2015.16.8.3463

12.AlAbdulKader, A., Gari, D., Al Yousif, G., Alghamdi, A., AlKaltham, S., AlDamigh, F., AlEisawi, Y., AlGhamdi, A., Al-Hayek, O. and AlMudhi, A., Perceived Barriers and Facilitators to Breast Cancer Screening Among Women in Saudi Arabia, *Breast Cancer: Targets and Therapy*, 2023, 505 https://doi.org/10.2147/BCTT.S406029

13.World Health Organization, Guidelines for the early detection and screening of breast cancer, 2006 https://applications.emro.who.int/dsaf/dsa696.pdf

14.Dey, S., Preventing breast cancer in LMICs via screening and/or early detection: The real and the surreal, *World journal of clinical oncology*, 2014, **5**:509 https://doi.org/10.5306/wjco.v5.i3.509

15.Casal-Guisande, M., Álvarez-Pazó, A., Cerqueiro-Pequeño, J., Bouza-Rodríguez, J.B., Peláez-Lourido, G. and Comesaña-Campos, A., Proposal and Definition of an Intelligent Clinical Decision Support System Applied to the Screening and Early Diagnosis of Breast Cancer, *Cancers*, 2023, **15**:1711 https://doi.org/10.3390/cancers15061711

16.Wilkinson, L. and Gathani, T., Understanding breast cancer as a global health concern, *The British Journal of Radiology*, 2022, **95:**20211033 https://doi.org/10.1259/bjr.20211033

17.Alatrash, M., Cultural barriers to breast cancer screening in Arab Women, *Handbook of healthcare in the Arab world*, 2021, 177 https://doi.org/10.1007/978-3-319-74365-3_160-1

18.Abdel-Salam, D.M., Mohamed, R.A., Alyousef, H.Y., Almasoud, W.A., Alanzi, M.B., Mubarak, A.Z. and Osman, D.M., Perceived barriers and awareness of mammography screening among Saudi women attending primary health centers, *Risk Management and Healthcare Policy*, 2020, 2553 https://doi.org/10.2147/RMHP.S277375

19.Alqahtani, W.S., Almufareh, N.A., Domiaty, D.M., Albasher, G., Alduwish, M.A., Alkhalaf, H., Almuzzaini, B., Al-Marshidy, S.S., Alfraihi, R., Elasbali, A.M. and Ahmed, H.G., Epidemiology of cancer in Saudi Arabia thru 2010–2019: A systematic review with constrained meta-analysis, *AIMS Public Health*, 2020, **7**:679 https://doi.org/10.3934/publichealth.2020053

20.El Saghir, N.S., Khalil, M.K., Eid, T., El Kinge, A.R., Charafeddine, M., Geara, F., Seoud, M. and Shamseddine, A.I., Trends in epidemiology and management of breast cancer in developing Arab countries: a literature and registry analysis, *International journal of surgery*, 2007, **5:**225 https://doi.org/10.1016/j.ijsu.2006.06.015

21.Chaabna, K., Ladumor, H. and Cheema, S., Ecological study of breast cancer incidence among nationals and nonnationals in the Gulf Cooperation Council countries, *Eastern Mediterranean Health Journal*, 2023, **29**:40.https://doi.org/10.26719/emhj.23.005

22.Siddiq, H., Alemi, Q., Mentes, J., Pavlish, C. and Lee, E., Preventive cancer screening among resettled refugee women from Muslim-majority countries: a systematic review, *Journal of Immigrant and Minority Health*, 2020, **22:**1067-1093 https://doi.org/10.1007/s10903-019-00967-6

23.Rethlefsen, M.L., Kirtley, S., Waffenschmidt, S., Ayala, A.P., Moher, D., Page, M.J. and Koffel, J.B., PRISMA-S: an extension to the PRISMA statement for reporting literature searches in systematic reviews, *Systematic reviews*, 2021, **10:**1 https://doi.org/10.1186/s13643-020-01542

24.Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., Shamseer, L., Tetzlaff, J.M., Akl, E.A., Brennan, S.E. and Chou, R., The PRISMA 2020 statement: an updated guideline for reporting systematic reviews, *International journal of surgery*, 2021, **88:**105906 https://doi.org/10.1016/j.ijsu.2021.105906

25.Hong, Q.N., Pluye, P., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M.P., Griffiths, F., Nicolau, B. and O'Cathain, A., Mixed methods appraisal tool (MMAT), version 2018, *Registration of copyright*, 2018, **1148552**

26.Al Dasoqi, K., Zeilani, R., Abdalrahim, M. and Evans, C., Screening for breast cancer among young J ordanian women: ambiguity and apprehension, *International nursing review*, 2013, **60:**351 https://doi.org/10.1111/inr.12025

27.Abolfotouh, M.A., BaniMustafa, A.A.A., Mahfouz, A.A., Al-Assiri, M.H., Al-Juhani, A.F. and Alaskar,

A.S., Using the health belief model to predict breast self examination among Saudi women, *BMC public health*, 2015, **15:**1 https://doi.org/10.1186/s12889-015-2510-y

28. Abdel-Aziz, S.B., Amin, T.T., Al-Gadeeb, M.B., Alhassar, A.I., Al-Ramadan, A., Al-Helal, M., Bu-Mejdad, M., Al-Hamad, L.A. and Alkhalaf, E.H., Perceived barriers to breast cancer screening among Saudi women at primary care setting, *Journal of preventive medicine and hygiene*, 2018, **59:**20 https://doi.org/10.15167/2421-4248/jpmh2018.59.1.689
29. Abdul-Lateef, S.J. and Shabaan, M., Assessment of female nursing students knowledge and practice about breast self-examination in Mosul university, *Mosul Journal of Nursing*, 2019, **7:**30 https://doi.org/10.33899/mjn.2019.162123
30. Ahmad, B., Kokash, E., Al Zabadi, H., Saed, M., Husean, M. and Kathem, W., Knowledge, Awareness, and Practice of Breast Self-Examination Among An-Najah National University Female Students, 2017
31. Ahmed, R.M., Elkhader, B.A., Hassan, W.B., Elsamani, M. and Eisa, R.A., Knowledge and Practices towards Breast Cancer Screening, *International Journal of Pharmaceutical Research & Allied Sciences*, 2021, **10** https://doi.org/10.51847/zENQXaeREj
32. Alshahrani, M., Alhammam, S.Y.M., Al Munyif, H.A.S., Alwadei, A.M.A., Alwadei, A.M.A., Alzamanan, S.S.M. and Aljohani, N.S.M., Knowledge, attitudes, and practices of breast cancer screening methods among female patients in primary healthcare centers in Najran, Saudi Arabia, *Journal of Cancer Education*, 2019, **34**:1167 https://doi.org/10.1007/s13187-018-1423-8
33. Salama, B.M., Factors affecting mammography screening utilization among educated women in Al Beheira governorate, Egypt, *Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive & Social Medicine*, 2020, **45:**522 https://doi.org/10.4103/ijcm.IJCM_41_20
34. Donnelly, T.T., Al Khater, A.H., Al-Bader, S.B., Al Kuwari, M.G., Al-Meer, N., Malik, M., Singh, R., Chaudhry, S. and Fung, T., Beliefs and attitudes about breast cancer and screening practices among Arab women living in Qatar: a cross-sectional study, *BMC women's health*, 2013, **13:**1 https://doi.org/10.1186/1472-6874-13-49
35. Abo Al-Shiekh, S.S., Ibrahim, M.A. and Alajerami, Y.S., Breast cancer knowledge and practice of breast self-examination among female university students, Gaza, *The Scientific World Journal*, 2021, 6640324 https://doi.org/10.1155/2021/6640324
36. Abou El azayiem Bayumi, H., Breast self-examination (BSE): knowledge and practice among female faculty of physical education in Assuit, South Egypt, *Breast*, 2016, **25:**1
37. Abu-Helalah, M.A., Alshraideh, H.A., Al-Serhan, A.A., Kawaleet, M. and Nesheiwat, A.I., Knowledge, barriers and attitudes towards breast cancer mammography screening in Jordan, *Asian Pac J Cancer Prev*, 2015, **16:**3981 https://doi.org/10.7314/apjcp.2015.16.9.3981
38. Albeshan, S.M., Hossain, S.Z., Mackey, M.G., Osmani, S.S.N. and Brennan, P.C., December. Understanding better the knowledge, beliefs, and attitudes toward breast cancer and breast screening practices among women living in Ras Al Khaimah, United Arab Emirates (UAE), In *Proceedings of the International Conference on Public Health*, 2017, **3:**208 https://doi.org/10.17501/icoph.2017.3224
39. Taher, Y.A., Samud, A.M., Al-Ghani, E.A. and Enemni, E.D., Barriers for early detection of breast cancer in Libyan women in Tripoli, *Libyan J Med Res*, 2014, **8**:126
40. Al-Khamis, N.K., Low awareness of breast cancer and considerable barriers to early presentation among Saudi women at a primary care setting, *Journal of Cancer Education*, 2018, **33:**391 https://doi.org/10.1007/s13187-016-1119-x
41. AL-Mulhim, F., Bakr, R., Almedallah, D., Alkaltham, N., Alotaibi, A. and Alnoaim, S., Screening mammography and breast self-examination: Attitudes and practices of women in the Eastern Province of Saudi Arabia, *Saudi Journal for Health Sciences*, 2018, **7** https://doi.org/10.4103/sjhs.sjhs_4_18
42. Alharbi, N.A., Alshammari, M.S., Almutairi, B.M., Makboul, G. and El-Shazly, M.K., Knowledge, awareness, and practices concerning breast cancer among Kuwaiti female school teachers, *Alexandria*

Journal of Chemical Health Risks

www.jchr.org

JCHR (2023) 13(3), 845-870 | ISSN:2251-6727

Journal of Medicine, 2012, **48** https://doi.org/10.1016/j.ajme.2011.10.003

43. Mariam, A.L., Natour, N. and Younes, D., Barriers to Breast Cancer Screening among Palestinian Women in Nablus Region, North-ern West Bank, *Palestinian Medical and Pharmaceutical Journal (Pal. Med. Pharm. J.)*, 2019, **5:**75 https://doi.org/10.59049/2790-0231.1061
44. Amin, B.A., Babakir-Mina, M., Mohialdeen, F.A. and Gubari, M.I., Knowledge, attitude and practice toward breast cancer among Kurdish Women in Sulaimani Governorate/Iraq, *Kurdistan Journal of Applied Research*, 2017, **2:**20 https://doi.org/10.24017/science.2017.2.1
45. Alshammari, S.A., Alhazmi, A.M., Alenazi, H.A., Alshammari, H.S. and Alshahrani, A.M., Mammography uptake among the female staff of King Saud University, *Journal of family medicine and primary care*, 2020, **9:**221 https://doi.org/10.4103/jfmpc.jfmpc_706_19
46. Doumit, M.A.A., Arevian, M. and Fares, S., Knowledge, attitude and practice of Lebanese women towards breast cancer, breast self-examination and mammography, 2015
47. Elobaid, Y.E., Aw, T.C., Grivna, M. and Nagelkerke, N., Breast cancer screening awareness, knowledge, and practice among Arab women in the United Arab Emirates: a cross-sectional survey, *PloS one*, 2014, **9:**105783 https://doi.org/10.1371/journal.pone.0105783
48. Eldessouki, R., Mabrouk, S. and Eid, S., Assessment of Knowledge on Breast cancer risk factors and the practice of breast self-examination among college educated female administrative employees in Fayoum University, *Fayoum University Medical Journal*, 2019, **3:**29
49. McEwan, J., Underwood, C. and Corbex, M., "Injustice! That is the cause": A qualitative study of the social, economic, and structural determinants of late diagnosis and treatment of breast cancer in Egypt, *Cancer Nursing*, 2014, **37:**468 https://doi.org/10.1097/NCC.0000000000000118
50. Nabaa, H.A. and Shelleh, N., Barriers preventing Palestinian women from having a mammogram: a qualitative study, *The Lancet*, 2018, **391:**S16 https://doi.org/10.1016/S0140-6736(18)30382-9
51. Hassoun, Y., Dbouk, H., Saad Aldin, E., Nasser, Z., Abou Abbas, L., Nahleh, Z. and Tfayli, A., Barriers to mammography screening: how to overcome them, *Middle East Journal of Cancer*, 2015, **6:**243.
52. Othman, A., Ahram, M., Al-Tarawneh, M.R. and Shahrouri, M., Knowledge, attitudes and practices of breast cancer screening among women in Jordan, *Health care for women international*, 2015, **36:**578 https://doi.org/10.1080/07399332.2014.926900
53. Yakout, S.M., El-shatbyMoursy, A.M., Moawad, S. and Salem, O., 2014. Awareness, Knowledge and Practice of Breast self-examination among groups of Female nursing students, Riyadh, Kingdom of Saudi Arabia. *International Research Journal of Biological Sciences*, *3*(2), pp.58-63.
54. Yousuf, S.A., Al Amoudi, S.M., Nicolas, W., Banjar, H.E. and Salem, S.M., Do Saudi nurses in primary health care centres have breast cancer knowledge to promote breast cancer awareness?, *Asian Pacific Journal of Cancer Prevention*, 2012, **13:**4459 http://dx.doi.org/10.7314/APJCP.2012.13.9.4459
55. Heena, H., Durrani, S., Riaz, M., AlFayyad, I., Tabasim, R., Parvez, G. and Abu-Shaheen, A., Knowledge, attitudes, and practices related to breast cancer screening among female health care professionals: a cross sectional study, *BMC women's health*, 2019, **19:**1 https://doi.org/10.1186/s12905-019-0819-x
56. Hussein, N.S., Ahmed, A.M. and Mohamed, H.E., Factors associated with Delayed Diagnosis of women Breast Cancer, *Minia Scientific Nursing Journal*, 2021, **9:**59 https://dx.doi.org/10.21608/msnj.2021.188498
57. Shkur Azeez, S., *Knowledge, attitude, and practice towards breast cancer, risk factors, and screening among Iraqi women* (Doctoral dissertation), 2021
58. Suhail, N., Breast cancer awareness, attitude, perception, and screening practices among female undergraduate students, *Breast cancer*, 2021, **68**:68 https://doi.org/10.51847/yhef5aq3yV
59. Abdallah, A.S., El-Gharabawy, R.M. and Al-suhaibany, H.O., Knowledge, attitude and practice about breast cancer among women in Saudi Arabia, *International Archives of Medicine*, 2015, **8** https://doi.org/10.3823/1847

Journal of Chemical Health Risks

www.jchr.org

JCHR (2023) 13(3), 845-870 | ISSN:2251-6727

60.Mehmood, M., Zafar, M., Albuqaisi, A.A., Alshammari, L.M., Ilyas, S.M.O. and Moinuddiin, K.G., Knowledge, Attitude and Preventive Practice towards Breast Cancer among Women Visiting Public Health Facility, Saudi Arabia, *Journal of Pharmaceutical Research International*, 2021, **33:**228 https://doi.org/10.9734/JPRI/2021/v33i49A33325

61.Alomair, A.N., Felemban, D.G., Felemban, M.S., Awadain, J.A., Altowargi, A.S. and Alfawzan, N.F., Knowledge, attitude, and practice of breast self-examination toward breast cancer among female students at King Saud University in Riyadh, Saudi Arabia, *International Journal of Medicine in Developing Countries*, 2020, **4**:429 http://dx.doi.org/10.24911/IJMDC.51-1576668182

62.Omar, A., Bakr, A. and Ibrahim, N., Female medical students' awareness, attitudes, and knowledge about early detection of breast cancer in Syrian Private University, Syria, *Heliyon*, 2020, **6:**e03819. https://doi.org/10.1016/j.heliyon.2020.e03819

63.Al-Zalabani, A.H., Alharbi, K.D., Fallatah, N.I., Alqabshawi, R.I., Al-Zalabani, A.A. and Alghamdi, S.M., Breast cancer knowledge and screening practice and barriers among women in Madinah, Saudi Arabia, *Journal of Cancer Education*, 2018, **33:**201 https://doi.org/10.1007/s13187-016-1057-7

64.Ayoub, N.M., Al-Taani, G.M., Almomani, B.A., Tahaineh, L., Nuseir, K., Othman, A. and Mensah, K.B., Knowledge and practice of breast cancer screening methods among female community pharmacists in Jordan: a cross-sectional study, *International Journal of Breast Cancer*, 2021, **2021:**1 https://doi.org/10.1155/2021/9292768

65.El Asmar, M., Bechnak, A., Fares, J., Al Oweini, D., Alrazim, A., El Achkar, A. and Tamim, H., Knowledge, attitudes and practices regarding breast cancer amongst Lebanese females in Beirut, *Asian Pacific journal of cancer prevention: APJCP*, 2018, **19:**625 https://doi.org/10.22034/APJCP.2018.19.3.625

66.Diab, S., Wahdan, I., Abdel Gawwad, E. and Sallam, S., Mammography screening utilization behavior among Egyptian female employees in Alexandria, *Journal of High Institute of Public Health*, 2018, **48:**114 https://dx.doi.org/10.21608/jhiph.2018.19918

67.Al-Wassia, R.K., Farsi, N.J., Merdad, L.A. and Hagi, S.K., Patterns, knowledge, and barriers of mammography use among women in Saudi Arabia, *Saudi medical journal*, 2017, **38:**913 https://doi.org/10.15537/smj.2017.9.20842

68.Allohaibi, A., Yousef, F., Joudah, G., Rajab, H., Sindi, I. and Albaik, M., Knowledge of Breast Cancer and the Practice of Breast Self-Examination in Saudi Women: An Online Survey, *Asian Journal of Pharmaceutical Research and Health Care*, 2021, **13:**187 https://doi.org/10.18311/ajprhc/2021/26763

69.Alrashedi, M.H., Saleh, W.E., Alhejaili, M.A., Alenezi, M.F., Alhawiti, S.H. and Mirghani, H.O., Evaluation of Knowledge and Perception of Risk Factors and Screening For Breast Cancer Among Adult Females in Tabuk City-2017, *Education*, 2017, **18:**4 https://doi.org/10.21276/ijmrp.2017.3.6.035

70.El-Nasr, E.M.S., Breast cancer risk factors and screening practices among women attending family health centers in Cairo Governorate, *Breast*, 2017, **20**:8 https://doi.org/10.9790/1959-0603011223

71.Eltwansy, M.S., Early detection of breast cancer: knowledge, perception and barriers among females: a cross sectional study at Zagazig District, *Egypt J Commun Med*, 2018, **36**:11 https://doi.org/10.21608/ejcm.2018.22992

72.Saca-Hazboun, H., Knowledge and health beliefs about breast cancer screening among rural Palestinian women: pilot study, *The Breast*, 2018, **41:**S26

73.Hamshari, S., Nazzal, Z., Altell, M., Nanaa, I., Jbara, R. and Sabri, R., Mammogram uptake and barriers among Palestinian women attending primary health care in North Palestine, *European Journal of General Practice*, 2021, **27**:264 https://doi=10.1080/13814788.2021.1985996

74.Al-Attar, W., Abdul Sattar, S., Al Mallah, N. and Wardia, W.I., Factors influencing mammography participation in Iraqi women, *IOSR Journal of Nursing and Health Science*, 2016, **5:**43 https://doi.org/10.9790/1959-0505024349

75.Jothirajan, M.D., Breast self-examination: Knowledge, attitude and practice among female nursing undergraduate students in the Northern Border University, KSA, *J Med Sci Clin Res*,

2020, **8**:233 https://dx.doi.org/10.18535/jmscr/v8i9.41

76. Madkhali, N.A., Santin, O., Noble, H. and Reid, J., Breast health awareness in an Arabic culture: A qualitative exploration, *Journal of advanced nursing*, 2019, **75:**1713 https://doi.org/10.1111/jan.14003

77. Nageeti, T.H., Abdelhameed, A.A., Jastania, R.A. and Felemban, R.M., Perspective of Saudi women in the Makkah region on breast cancer awareness, *Journal of Family & Community Medicine*, 2017, **24:**97 https://doi.org/10.4103%2F2230-8229.205116

78. AL-Behadily, H.H. and Al-Tukmagi, H.F., Knowledge, attitudes and barriers towards breast cancer health education among Iraqi community pharmacists, *Iraqi Journal of Pharmaceutical Sciences (P-ISSN 1683-3597 E-ISSN 2521-3512)*, 2017, 56 https://doi.org/10.31351/vol26iss2pp56-65

79. Ahmed, S.A.E.M. and Shrief, S.E., The effect of health promotion program on female breast self-examination knowledge and practice, *Egyptian Nursing Journal*, 2019, **16:**25 https://doi.org/10.4103/ENJ.ENJ_24_18

80. Al-Harbi, M.F., Al-Haji, K., Moawed, S.A.E.A. and Hawsawi, A., Using health belief model to probe female adolescent perception about breast cancer in Riyadh city, *American Journal of Nursing*, 2017, **6:**358 https://doi.org/10.11648/j.ajns.20170604.20

81. Ali, S.I., Al-Suroj, H.R., Al Ali, F.B., Al-Saleh, K.H. and Al-Hammar, L.E., Awareness and attitude among Saudi females toward breast cancer screening in Al-Ahsa, KSA, *The Egyptian Journal of Hospital Medicine*, 2018, **71:**2516 https://doi.org/10.12816/0045650

82. Al-Sejari, M. M., Breast Self-examination Knowledge and Practice among Kuwaiti Women, *2nd internationalcongress on contemporary issues in women cancers and Gynecological Oncology, London, UK*, 2018, 15:1 https://doi.org/10.36394/jhss/15/2/15

83. Alneema, B.A., Knowledge, Attitude, and Practice of Breast-Self Examination among School Teachers in Mosul City, *Tikrit Medical Journal*, 2013, **19**

84. Boulos, D.N. and Ghali, R.R., Awareness of breast cancer among female students at Ain Shams University, Egypt, *Global journal of health science*, 2014, **6:**154. https://doi.org/10.5539/gjhs.v6n1p154

85. Chattu, V.K., Kumary, S. and Bhagavathula, A.S., Community-based study on the knowledge, awareness, and practices of females towards breast cancer in Buraimi, Oman, *South Asian Journal of Cancer*, 2018, **7:**215 https://doi.org/10.4103/sajc.sajc_71_18

86. Eid, M.M., Alsufiani, M.B., Alkhushi, A.A., Hamad, B., Alwithinani, G.B.Y., Alnazef, L.F., Alqorashi, N.H., Awad, O., Althaqafi, R.M.A., Alotaibi, R.T. and Alqahtani, R.M., Awareness about breast cancer risk factor and breast self-examination among female students at Taif university, *Journal of Advanced Pharmacy Education & Research| Jul-Sep*, 2021, **11** https://doi.org/10.51847/5lslF8cPOX

87. Elsayed, A.A. and Mohammed, H., Prevention of breast cancer: Effects of early education on knowledge and practice of university students in Saudi Arabia, *IOSR JNHS*, 2019, **8:**1 https://doi.org/10.9790/1959-0805090109

88. Hamad, K., Khalil, H. and Awlla, H., Knowledge of breast cancer risk factors and practice of breast self-examination among female students of soran technical institute, *Polytechnic Journal*, 2018, **8:**734 https://doi.org/10.25156/ptj.2018.8.3.288

89. Hamid, H.G., The impact of educational level on Knowledge, Attitude and Practices toward breast cancer among women attending primary health center in Kufa city, *Al-Qadisiyah Medical Journal*, 2015, **11:**78

90. Al Odwan, M.I., Khreisat, I.F. and Khreisat, A.F., Knowledge attitude and practice of breast self examination among female graduates in Princess Muna College of Nursing and Royal Medical Services College of Allied Health Professions, *Journal of the Royal Medical Services*, 2016, **23:**41 https://doi.org/10.12816/0032200

91. Salem, M.A.A., Al Shazly, H.A., Ibrahem, R.A., Kasemy, Z.A. and Abd El-Roaf, S.Y., Knowledge, attitude, and practice of breast self-examination among women attending primary health care facility, Menoufia Governorate, Egypt, *Menoufia Medical Journal*, 2020, **33:**44 https://doi.org/10.4103/mmj.mmj_557_15

Journal of Chemical Health Risks

www.jchr.org

JCHR (2023) 13(3), 845-870 | ISSN:2251-6727

92. Salim, K.S., Al-Attar, W.M. and Alani, B.G., Breast self-examination practice among female students in Iraq, *Systematic Reviews in Pharmacy*, 2021, **12:**516
93. Younis, M., Al-Rubaye, D., Haddad, H., Hammad, A. and Hijazi, M., Knowledge and awareness of breast cancer among young women in the United Arab Emirates, *Advances in Breast Cancer Research*, 2016, **5**:163 http://dx.doi.org/10.4236/abcr.2016.54019
94. Aljohani, S., Saib, I. and Noorelahi, M., Women's performance of breast cancer screening (breast self-examination, clinical breast exam and mammography), *Advances in Breast Cancer Research*, 2016, **6:**16 http://dx.doi.org/10.4236/abcr.2017.61002
95. Abu-Shammala, B.I. and Abed, Y., Breast cancer knowledge and screening behavior among Female school teachers in Gaza city, *Asian Pacific Journal of Cancer Prevention*, 2015, **16**:7707 http://dx.doi.org/10.7314/APJCP.2015.16.17.7707
96. Al-Sharbatti, S.S., Shaikh, R.B., Mathew, E. and Al-Biate, M.A.S., Breast self examination practice and breast cancer risk perception among female university students in Ajman, *Asian Pacific Journal of Cancer Prevention*, 2013, **14**:4919 http://dx.doi.org/10.7314/APJCP.2013.14.8.4919
97. Alshahrani, M.S., Sultan, S.A.A., Alhammam, S.Y., Alshaghath, I.H., Alfayez, E.H.A., Alyami, M.A.M. and Alfayez, E.H.A., Assessment and Practice of Female Health Care Workers Regarding Risk of Breast Cancer and Screening Methods Cross-Sectional Study, Saudi Arabia, *Open Journal of Obstetrics and Gynecology*, 2020, **10**:201 https://doi.org/10.4236/ojog.2020.1020017
98. Bawazir, A., Bashateh, N., Jradi, H. and Breik, A.B., Breast cancer screening awareness and practices among women attending primary health care centers in the Ghail Bawazir District of Yemen, *Clinical breast cancer*, 2019, **19**:e20 https://doi.org/10.1016/j.clbc.2018.09.005
99. Manzour, A.F. and Gamal Eldin, D.A., Awareness about breast cancer and mammogram among women attending outpatient clinics, Ain Shams University Hospitals, Egypt, *Journal of the Egyptian Public Health Association*, 2019, **94**:1 https://doi.org/10.1186/s42506-019-0026-5
100. Al-Amoudi, S.M., Knowledge and attitude of Women with Special Needs towards Breast Cancer in Saudi Arabia: A cross-sectional Study, *Life Sci J*, 2012, **9**:1348
101. Dweib, M., Khraiwesh, A., Shakarna, A. and Solimia, S., Knowledge, beliefs and attitudes of female university students in Palestine toward breast cancer and breast self-examination, *Hebron University Research Journal (Natural Sciences)*, 2020, *9*
102. Al Alwan, N.A., Al Attar, W.M. and Al Mallah, N., Barriers to baseline needs for early detection of breast cancer among Iraqi female patients, *Iraqi National Journal of Nursing Specialties*, 2016, **29**
103. Al-Shehri, O., The Impact of Community-Based Awareness Campaigns on the Early Breast Examination among Women at King Faisal University, *Open Journal of Preventive Medicine*, 2015, **5:**400 http://dx.doi.org/10.4236/ojpm.2015.59044
104. Amasha, H.A.R., Breast self-examination and risk factors of breast cancer: Awareness of Jordanian nurses, *Health science journal*, 2013, **7:**303
105. Desouky, D.E. and Taha, A.A., Effects of a training program about breast cancer and breast self-examination among female students at Taif University, *Journal of the Egyptian Public Health Association*, 2015, **90:**8 https://doi.org/10.1097/01.EPX.0000460082.28774.71
106. Azar, G., Barriers to and facilitators for breast cancer screening among Lebanese women, 2018
107. Nazzal, Z., Sholi, H., Sholi, S., Sholi, M. and Lahaseh, R., Mammography screening uptake among female health care workers in primary health care centers in Palestine-motivators and barriers, *Asian Pacific Journal of Cancer Prevention*, 2016, **17**:2549 http://dx.doi.org/10.7314/APJCP.2016.17.5.2549
108. Suleiman, A.K., Awareness and attitudes regarding breast cancer and breast self-examination among female Jordanian students, *Journal of basic and clinical pharmacy*, 2014, **5:**74 https://doi.org/10.4103/0976-0105.139730
109. Taha, H., Nyström, L., Al-Qutob, R., Berggren, V., Esmaily, H. and Wahlström, R., Home visits to improve breast health knowledge and screening practices in a less privileged area in Jordan, *BMC*

Public Health, 2014, **14:**1 https://doi.org/10.1186/1471-2458-14-428

110. Yaghmour, K.A., Alamri, S.J., Alfaqeh, R.H., Alnashri, L.M., Alamri, B.J. and Makin, M.A., Awareness and knowledge of breast cancer screening methods among women in Al-Qunfudah, Saudi Arabia, *Journal of Advances in Medicine and Medical Research*, 2020, **32**:81 https://doi.org/10.9734/jammr/2020/v32i1730648
111. Younes, D.Z., *Breast Cancer Screening Barriers among Women in Nablus Governorate* (Doctoral dissertation), 2015
112. Idris, S.A., Hamza, A.A., Hafiz, M.M., Ali, M.E.A. and El Shallaly, G.E., Knowledge, attitude and practice of breast self examination among final years female medical students in Sudan, *breast cancer*, 2013, **116**
113. Al-Ghadeer, B., Al-Ghadeer, A. and Aldoughan, S., Breast cancer knowledge and barriers to screening among women in Al-Ahsa, Saudi Arabia, *Age*, 2021, **16:**34 https://doi.org/10.24911/IJMDC.2.1.7
114. Moussa, M.M. and Shalaby, N.S., Effect of breast self-examination education program on knowledge, attitude and practice of nursing students, *Int J Res Stud Biosci (IJRSB)*, 2014, **2**:40
115. El-Hosary, E. A. S., Health Belief Model as a predictor of Self-Breast Examination Behaviors among Female Shaqra University Students, *Int. J. of Novel Research in Healthcare and Nursing*, 2021, **8:**304
116. Elshami, M., Abu Kmeil, H., Abu-Jazar, M., Mahfouz, I., Ashour, D., Aljamal, A., Mohareb, N., Elbalaawi, R., Dabbour, R., Ghaith, J. and Hasan, T., Breast Cancer awareness and barriers to early presentation in the Gaza-strip: a cross-sectional study, *Journal of global oncology*, 2018, **4:**1 https://doi.org/10.1200/JGO.18.00095
117. Sindi, R.A., Alzahrani, A.A., Alzahrani, N.A., Salman, R.A.B. and Alshareef, S.A., Awareness Level, Knowledge and Attitude towards Breast Cancer between Medical and Non-Medical University Students in Makkah Region: A Cross Sectional Study, *Int J Cancer Clin Res*, 2019, **6:**106 https://doi.org/10.23937/2378-3419/1410106
118. Al-Haddad, M. S., Al-Adwani, M., Abu-Rukbah, W., Al-Otaibi, A. and Al-Hayfani, M., Knowledge and practice of university female students toward breast cancer, *Archives of Pharmacy Practice*, 2016, **7** https://doi.org/10.4103/2045-080X.191980
119. Meshal, A.D., Mustafa, A., Nooh, R., Alamri, F. and Fareed, M., Knowledge, attitude and practice about breast cancer among Saudi Women: A cross-sectional study in Riyadh, *International Journal of Medical Research & Health Sciences*, 2019, **8:**38
120. Taha, H., 2013. *Voices of fear and safety: women's ambivalence towards breast cancer and breast health practices in Jordan*. Karolinska Institutet (Sweden).
121. Muhanna, A.M. and Floyd, M.J., A qualitative study to determine Kuwaiti Women's knowledge of breast cancer and barriers deterring attendance at mammography screening, *Radiography*, 2019, **25:**65 https://doi.org/10.1016/j.radi.2018.10.003
122. Soliman, A. A., Khouchani, M. and Renne, E. P., Sociocultural Barriers Related to Late-Stage Presentation of Breast Cancer in Morocco, *J Cancer Educ*, 2019, **34**:735 https://doi.org/10.1007/s13187-018-1365-1
123. Levesque, J.F., Harris, M.F. and Russell, G., Patient-centred access to health care: conceptualising access at the interface of health systems and populations, *International journal for equity in health*, 2013, **12:**1 https://doi.org/10.1186/1475-9276-12-18
124. Ismail, G. M., Abd El Hamid, A. A. and Abd El Naby, A. G., Assessment of factors that hinder early detection of breast cancer among females at Cairo University Hospital, *World Appl Sci J*, 2013, **23**:99 https://dx.doi.org/10.5829/idosi.wasj.2013.23.01.73124
125. Jomaa, M.K., Gado, N.M., Elgazawy, H., Sayed, F., Mousselhy, A. and Alfaar, A.S., 86P Assessment of breast cancer screening awareness among relatives of Egyptian breast cancer patients, *Annals of Oncology*, 2015, **26:**16 https://doi.org/https://doi.org/10.1093/annonc/mdv519.35
126. Mamdouh, H. M., El-Mansy, H., Kharboush, I. F., Ismail, H. M., Tawfik, M. M., El-Baky, M. A. and El Sharkawy, O. G., Barriers to breast cancer screening among a sample of Egyptian females, *J Family Community Med*, 2014, **21**:119 https://doi.org/10.4103/2230-8229.134771
127. Abu Sharour, L., Al-Ghabeesh, S., Suleiman, K., Salameh, A.B., Jacoob, S. and Al-Kalaldeh, M.,

Predictors of breast self-examination performance among Jordanian university female students, *European journal of cancer care*, 2017, **26:**e12622 https://doi.org/10.1111/ecc.12622

128. Charaka, H., Khalis, M., Elfakir, S., Huybrechts, I., Khazraji, Y. C., Lyoussi, B. and Nejjari, C., Knowledge, perceptions, and satisfaction of Moroccan women towards a new breast cancer screening program in Morocco, *Journal of Cancer Education*, 2021, **36:**657 https://doi.org/10.1007/s13187-019-01680-6
129. Deema M, H., Sana H, A., Yasmeen S, A. S., Sheikha H, A., Reem S, A., Ashgan M, A. M. and Salwa I, H., Breast cancer awareness and breast self-examination in Northern Saudi Arabia., A preliminary survey, 2013
130. Donnelly, T.T., Al Khater, A.H., Al-Bader, S.B., Al Kuwari, M.G., Al-Meer, N., Malik, M., Singh, R. and Jong, F.C.D., Arab women's breast cancer screening practices: a literature review. *Asian Pacific Journal of Cancer Prevention*, 2013, **14**:4519 http://journal.waocp.org/article_27982.html
131. Flores-Luevano, S., Shokar, N. K., Dwivedi, A. K., Shokar, G. S. and Defeu, S. N., Breast Cancer Fear Among Mexican American Women in the United States, *Breast Cancer (Auckl)*, 2020, **14:**1178223420952745 https://doi.org/10.1177/1178223420952745
132. Pai, V. R. and Rebner, M., How to Minimize Patient Anxiety From Screening Mammography, *Journal of Breast Imaging*, 2021, **3:**603 https://doi.org/10.1093/jbi/wbab057
133. Hing, J.J.X., Lee, W.P., Chua, Y.N.S., Tan, P.T., Mok, C.W., Sudhakar, S.S., Seah, C.M. and Tan, S.M., Impact of health talks on knowledge, attitudes and perception of breast cancer screening and treatment amongst healthcare staff by a breast surgical unit in a public healthcare institution: a cross-sectional study, *BMC Women's Health*, 2021, **21:**308 https://doi.org/10.1186/s12905-021-01424-z
134. Salako, O., Roberts, A. A., Isibor, V. I., Babatunde, O., Fatiregun, O. and Nwogu, C. N., Innovative Breast Cancer Awareness and Advocacy Campaign, *Journal of Global Oncology*, 2017, **3:**169 https://doi.org/10.1200/jgo.2016.003509
135. Wu, T. Y. and Lee, J., Promoting Breast Cancer Awareness and Screening Practices for Early Detection in Low-Resource Settings, *Eur J Breast Health*, 2019, **15:**18 https://doi.org/10.5152/ejbh.2018.4305
136. Naz, M.S.G., Kariman, N., Ebadi, A., Ozgoli, G., Ghasemi, V. and Fakari, F.R., Educational interventions for cervical cancer screening behavior of women: a systematic review, *Asian Pacific journal of cancer prevention: APJCP*, 2018, **19:**875 https://doi.org/10.22034%2FAPJCP.2018.19.4.875
137. March, S., Villalonga, B., Sanchez-Contador, C., Vidal, C., Mascaro, A., de Lluc Bennasar, M. and Esteva, M., Barriers to and discourses about breast cancer prevention among immigrant women in Spain: a qualitative study, *BMJ open*, 2018, **8:**e021425 https://doi.org/10.1136/ bmjopen-2017-021425
138. Fatouh, A., Hamido, S., Moustafa, E. and Yousif, A.M., Women's perception regarding Screening for early detection of Breast Cancer, *Egyptian Journal of Health Care*, 2020, **11:**242 https://doi.org/10.21608/ejhc.2020.125757
139. Cohen, M. and Azaiza, F., Early breast cancer detection practices, health beliefs, and cancer worries in Jewish and Arab women, *Prev Med*, 2005, **41**:852 https://doi.org/10.1016/j.ypmed.2005.07.001
140. Cohen, M. and Azaiza, F., Developing and testing an instrument for identifying culture-specific barriers to breast cancer screening in Israeli Arab women, *Acta Oncol*, 2008, **47**:1570 https://doi.org/10.1080/02841860802078069
141. Zhang, J.M., Zhang, M.R., Yang, C.H. and Li, Y., The meaning of life according to patients with advanced lung cancer: a qualitative study, *International Journal of Qualitative Studies on Health and Well-being*, 2022, **17**:2028348 https://doi.org/10.1080/17482631.2022.2028348
142. Katapodi, M. C., Facione, N. C., Miaskowski, C., Dodd, M. J. and Waters, C., The influence of social support on breast cancer screening in a multicultural community sample, *Oncol Nurs Forum*, 2002, **29**:845 https://doi.org/10.1188/02.Onf.845-852
143. Jensen, L. F., Pedersen, A. F., Andersen, B. and Vedsted, P., Social support and non-participation in breast cancer screening: a Danish cohort study, *Journal of Public Health*, 2015, **38:**335 https://doi.org/10.1093/pubmed/fdv051
144. Smalls, B. L., Aroh, A., McQuerry, K., Adegboyega, A., Schoenberg, N. and Hatcher, J., Social support

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www.jchr.org

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and breast cancer screening in rural Appalachia. *Psychooncology*, 2018, **27:** 2281 https://doi.org/10.1002/pon.4828

145. Grady, K. E., Lemkau, J. P., McVay, J. M. and Reisine, S. T., The importance of physician encouragement in breast cancer screening of older women, *Preventive Medicine*, 1992, **21:**766 https://doi.org/https://doi.org/10.1016/0091-7435(92)90083-T
146. Jensen, L. F., Mukai, T. O., Andersen, B. and Vedsted, P., The association between general practitioners' attitudes towards breast cancer screening and women's screening participation, *BMC cancer*, 2012, **12:**254 https://doi.org/10.1186/1471-2407-12-254
147. Azaiza, F. and Cohen, M., Health beliefs and rates of breast cancer screening among Arab women, *Journal of Women's Health*, 2006, **15:**520 https://doi.org/10.1089/jwh.2006.15.520
148. Brill, J.V., Screening for cancer: the economic, medical, and psychosocial issues, *The American Journal of Managed Care*, 2020, **26:**S300 https://doi.org/ https://doi.org/10.37765/ajmc.2020.88534
149. McAlearney, A. S., Reeves, K. W., Tatum, C. and Paskett, E. D., Cost as a barrier to screening mammography among underserved women, *Ethn Health*, 2007, **12**:189 https://doi.org/10.1080/13557850601002387
150. Castaldi, M., Smiley, A., Kechejian, K., Butler, J. and Latifi, R., Disparate access to breast cancer screening and treatment,, *BMC Women's Health*, 2022, **22**:249 https://doi.org/10.1186%2Fs12905-022-01793-z
151. Mitchell, J., Lannin, D.R., Mathews, H.F. and Swanson, M.S., Religious beliefs and breast cancer screening, *Journal of Women's Health*, 2002, **11:**907 https://doi.org/10.1089/154099902762203740

Appendix 1:

No.	First author Name	Title of articles	Date of publication	Quality
1	Alshahrani, M. S., et al.	Assessment and Practice of Female Health Care Workers Regarding Risk of Breast Cancer and Screening Methods Cross-Sectional Study, Saudi Arabia	2020, Saudi Arabia	High
2	Alshammari, S. A., et al.	Mammography uptake among the female staff of King Saud University	2020, Saudi Arabia	High
3	Al-Shehri, O.	The Impact of Community-Based Awareness Campaigns on the Early Breast Examination among Women at King Faisal University.	2015, Saudi Arabia	Medium
4	Al-Wassia, R. K., et al.	Patterns, knowledge, and barriers of mammography use among women in Saudi Arabia.	2017, Saudi Arabia	High
5	Al-Zalabani, A. H., et al.	Breast Cancer Knowledge and Screening Practice and Barriers Among Women in Madinah, Saudi Arabia.	2018, Saudi Arabia	High
6	Amasha, H. A.-R.	Breast self-examination and risk factors of breast cancer: Awareness of Jordanian nurses.	2013, Jordan	High
7	Amin, B. A., et al.	Knowledge, attitude and practice toward breast cancer among Kurdish Women in Sulaimani Governorate/Iraq.	2017, Iraq	High
8	Ayoub, N. M., et al.	Knowledge and Practice of Breast Cancer Screening Methods among Female Community Pharmacists in Jordan: A Cross-Sectional Study.	2021, Jordan	High

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9	Azar, G.	Barriers to and facilitators for breast cancer screening among Lebanese women.	2018, Lebanon	High
10	Bawazir, A., et al.	Breast cancer screening awareness and practices among women attending primary health care centers in the Ghail Bawazir District of Yemen.	2019, Yemen	Medium
11	Salama, B.M.	Factors Affecting Mammography Screening Utilization among Educated Women in Al Beheira Governorate, Egypt.	2020, Egypt	High
12	Boulos, D. N. & Ghali, R.R.	Awareness of breast cancer among female students at Ain Shams University, Egypt.	2014, Egypt	High
13	Charaka, H., et al.	Knowledge, perceptions, and satisfaction of Moroccan women towards a new breast cancer screening program in Morocco.	2021, Morocco	Medium
14	Chattu, V. K., et al.	Community-based study on the knowledge, awareness, and practices of females towards breast cancer in Buraimi, Oman.	2018, Oman	High
15	Desouky, D.E. and Taha, A.A.	Effects of a training program about breast cancer and breast self-examination among female students at Taif University.	2015, Saudi Arabia	High
16	Diab, S., et al.	Mammography screening utilization behavior among Egyptian female employees in Alexandria.	2018, Egypt	High
17	Donnelly, T. T., et al.	Beliefs and attitudes about breast cancer and screening practices among Arab women living in Qatar: a cross-sectional study.	2013, Qatar	High
18	Doumit, M. A. A., et al.	Knowledge, attitude and practice of Lebanese women towards breast cancer, breast self-examination and mammography.	2015, Lebanon	High
19	Eid, M. M., et al.	Awareness about breast cancer risk factor and breast self-examination among female students at Taif university.	2021, Saudi Arabia	High
20	El Asmar, M., et al.	Knowledge, Attitudes and Practices Regarding Breast Cancer amongst Lebanese Females in Beirut.	2018, Lebanon	High
21	Eldessouki, R., et al.	Assessment of Knowledge on Breast cancer risk factors and the practice of breast self-examination among college educated female administrative employees in Fayoum University.	2019, Egypt	High
22	El-Hosary, E. A. S.	Health Belief Model as a predictor of Self-Breast Examination Behaviors among Female Shaqra University Students.	2021, Saudi Arabia	High
23	El-Nasr., et al.	Breast Cancer risk factors and screening practices Among Women Attending Family Health Centers in Cairo Governorate.	2017, Egypt	High
24	Elobaid, Y. E., et al.	Breast cancer screening awareness, knowledge, and practice among Arab women in the United Arab Emirates: a cross-sectional survey.	2014, United Arab Emirates (UAE)	High

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25	Elsayed, A. A., et al.	Prevention of breast cancer: Effects of early education on knowledge and practice of university students in Saudi Arabia.	2019, Saudi Arabia	High
26	Elshami, M., et al.	Breast Cancer Awareness and Barriers to Early Presentation in the Gaza-Strip: A Cross-Sectional Study.	2018, Palestine	High
27	Eltwansy, M. S.	Early Detection of Breast Cancer: Knowledge, Perception and Barriers among Females: A Cross Sectional Study at Zagazig District.	2018, Egypt	High
28	Fatouh, A., et al.	Women's perception regarding Screening for early detection of Breast Cancer.	2020, Egypt	High
29	Hamad, K. J., et al.	Knowledge of breast cancer risk factors and practice of breast self-examination among female students of soran technical institute.	2018, Iraq	High
30	Hamid, H. G.	The impact of educational level on Knowledge, Attitude and Practices toward breast cancer among women attending primary health center in Kufa city.	2015, Iraq	High
31	Hamshari, S., et al.	Mammogram uptake and barriers among Palestinian women attending primary health care in North Palestine.	2021, Palestine	High
32	Hassoun, Y., et al.	Barriers to mammography screening: How to overcome them.	2015, Lebanon	Medium
33	Heena, H., et al.	Knowledge, attitudes, and practices related to breast cancer screening among female health care professionals: a cross sectional study.	2019, Saudi Arabia	High
34	Hussein, D. M., et al.	Breast cancer awareness and breast self-examination in Northern Saudi Arabia. A preliminary survey.	2013, Saudi Arabia	High
35	Hussein, N. S., et al.	Factors associated with Delayed Diagnosis of women Breast Cancer.	2021, Egypt	High
36	Idris, S. A., et al.	Knowledge, attitude and practice of breast self examination among final years female medical students in Sudan.	2013, Sudan	Medium
37	Ismail, G. M., et al.	Assessment of factors that hinder early detection of breast cancer among females at Cairo University Hospital.	2013, Egypt	High
38	Jomaa, M. K., et al.	86P Assessment of breast cancer screening awareness among relatives of Egyptian breast cancer patients.	2015, Egypt	High
39	Dweib, M., et al.	Knowledge, beliefs and attitudes of female university students in Palestine toward breast cancer and breast self-examination. Hebron University Research Journal-A (Natural Sciences)	2020, Palestine	Medium
40	Madkhali, N. A., et al.	Breast health awareness in an Arabic culture: A qualitative exploration.	2019, Saudi Arabia	High
41	Mamdouh, H. M., et al.	Barriers to breast cancer screening among a sample of Egyptian females.	2014, Egypt	High

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42	Manzour, A.F. and Gamal Eldin	Awareness about breast cancer and mammogram among women attending outpatient clinics, Ain Shams University Hospitals, Egypt.	2019, Egypt	High
43	Muhanna, A.M. and Floyd, M.J.	A qualitative study to determine Kuwaiti Women's knowledge of breast cancer and barriers deterring attendance at mammography screening.	2019, Kuwait	High
44	McEwan, J., et al.	Injustice! That is the cause: a qualitative study of the social, economic, and structural determinants of late diagnosis and treatment of breast cancer in Egypt.	2014, Egypt	High
45	Mehmood, M., et al.	Knowledge, Attitude and Preventive Practice towards Breast Cancer among Women Visiting Public Health Facility, Saudi Arabia.	2021, Saudi Arabia	High
46	Meshal, A.-D., et al.	Knowledge, attitude and practice about breast cancer among Saudi women: A cross-sectional study in Riyadh.	2019, Saudi Arabia	High
47	Abdallah, A. S., et al.	Knowledge, attitude and practice about breast cancer among women in Saudi Arabia.	2015, Saudi Arabia	High
48	Abdel-Aziz, S. B., et al.	Perceived Barriers to Breast Cancer Screening among Saudi Women at Primary Care Setting.	2018, Saudi Arabia	High
49	Abdel-Salam, D. M., et al.	Perceived Barriers and Awareness of Mammography Screening Among Saudi Women Attending Primary Health Centers.	2020, Saudi Arabia	High
50	Abdul-Lateef & Shabaan,	Assessment of female nursing students knowledge and practice about breast self-examination in Mosul university.	2019, Iraq	High
51	Abo Al-Shiekh, S. S., et al.	Breast Cancer Knowledge and Practice of Breast Self-Examination among Female University Students, Gaza.	2021, Palestine	High
52	Abolfotouh, M. A., et al.	Using the health belief model to predict breast self examination among Saudi women.	2015, Saudi Arabia	High
53	Abou El azayiem Bayumi, H.	Breast Self-Examination (BSE): Knowledge and Practice among Female Faculty of Physical Education in Assuit, South Egypt.	2016, Egypt	High
54	Abu Sharour, L., et al.	Predictors of breast self-examination performance among Jordanian university female students.	2017, Jordan	High
55	Abu-Helalah, M. A., et al.	Knowledge, barriers and attitudes towards breast cancer mammography screening in jordan.	2015, Jordan	High
56	Abu-Shammala, B.I. and Abed, Y.	Breast cancer knowledge and screening behavior among Female school teachers in Gaza city.	2015, Palestine	High
57	Ahmad, B., et al.	Knowledge, awareness, and practice of Breast Self-Examination among An-Najah National University female students.	2017, Palestine	High
58	Ahmed, R. M., et al.	Knowledge and Practices towards Breast Cancer Screening.	2021, Saudi Arabia	High
59	Ahmed, S. A. E.-M., et al.	The effect of health promotion program on female breast self-examination knowledge and practice.	2019, Egypt	High

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60	Al Alwan, N. A., et al.	Barriers to Baseline Needs for Early Detection of Breast Cancer among Iraqi Female Patients.	2016, Iraq	High
61	Al Dasoqi, K., et al.	Screening for breast cancer among young Jordanian women: ambiguity and apprehension.	2013, Jordan	High
62	Al-Amoudi, S. M.	Knowledge and attitude of Women with Special Needs towards Breast Cancer in Saudi Arabia: A cross-sectional Study.	2012, Saudi Arabia	High
63	Al-Attar, W., et al.	Factors Influencing Mammography Participation in Iraqi Women.	2016, Iraq	High
64	Al-Azri, M., et al.	Barriers and Attitudes toward Breast Cancer Screening among Omani Women.	2020, Oman	High
65	Al-Behadily, H. H., et al.	Knowledge, attitudes and barriers towards breast cancer health education among Iraqi community pharmacists. Iraqi Journal of Pharmaceutical Sciences.	2017, Iraq	High
66	Albeshan, S. M., et al.	Understanding better the knowledge, beliefs, and attitudes toward breast cancer and breast screening practices among women living in Ras Al Khaimh, United Arab Eirtes.	2017, United Arab Emirates (UAE)	High
67	Al-Ghadeer, B., et al.	Breast cancer knowledge and barriers to screening among women in Al-Ahsa, Saudi Arabia. Age.	2021, Saudi Arabia	High
68	Al-Haddad, M. S., et al.	Knowledge and practice of university female students toward breast cancer.	2016, Saudi Arabia	High
69	Al-Harbi, M. F., et al.	Using Health Belief Model to Probe Female Adolescent Perception About Breast Cancer in Riyadh City.	2017, Saudi Arabia	High
70	Alharbi, N. A., et al.	Knowledge, awareness, and practices concerning breast cancer among Kuwaiti female school teachers.	2012, Kuwait	High
71	Ali, S. I., et al.	Awareness and attitude among Saudi females toward breast cancer screening in Al-Ahsa, KSA.	2018, Saudi Arabia	High
72	Aljohani, S., et al.	Women's performance of breast cancer screening (breast self-examination, clinical breast exam and mammography).	2018, Saudi Arabia	High
73	Al-Khamis, N. K.	Low Awareness of Breast Cancer and Considerable Barriers to Early Presentation Among Saudi Women at a Primary Care Setting.	2018, Saudi Arabia	High
74	Allohaibi, A., et al.	Knowledge of Breast Cancer and the Practice of Breast Self-Examination in Saudi Women: An Online Survey.	2021, Saudi Arabia	High
75	Al-Mulhim, F., et al.	Screening mammography and breast self-examination: Attitudes and practices of women in the Eastern Province of Saudi Arabia.	2018, Saudi Arabia	High
76	Alneema, B. A.	Knowledge, Attitude, and Practice of Breast-Self Examination among School Teachers in Mosul City.	2013, Iraq	High
77	Alomair, A. N., et al.	Knowledge, attitude and practice of breast self-examination toward breast cancer among female	2020, Saudi Arabia	High

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		students at king Saud University in Riyadh, Saudi Arabia. EC Gynaecology.		
78	Alrashedi., et al.	Evaluation of Knowledge and Perception of Risk Factors and Screening For Breast Cancer Among Adult Females in Tabuk City-2017.	2017, Saudi Arabia	High
79	Al-Sejari,. Et al.	Breast Self-examination Knowledge and Practice among Kuwaiti Women.	2018, Kuwait	High
80	Alshahrani, M., et al.	Knowledge, Attitudes, and Practices of Breast Cancer Screening Methods Among Female Patients in Primary Healthcare Centers in Najran, Saudi Arabia.	2019, Saudi Arabia	High
81	Moussa, M.M. and Shalaby, N.S	Effect of breast self-examination education program on knowledge, attitude and practice of nursing students.	2014, Egypt	High
82	Nabaa, H. A., et al.	Barriers preventing Palestinian women from having a mammogram: a qualitative study.	2018, Palestine	High
83	Nageeti, T. H., et al.	Perspective of Saudi women in the Makkah region on breast cancer awareness.	2017, Saudi Arabia	High
84	Nazzal, Z., et al.	Mammography Screening Uptake among Female Health Care Workers in Primary Health Care Centers in Palestine - Motivators and Barriers.	2016, Palestine	High
85	Al Odwan, M. I. A. L., et al.	Knowledge Attitude and Practice of Breast Self Examination among Female Graduates in Princess Muna College of Nursing and Royal Medical Services College of Allied Health Professions. JRMS.	2016, Saudi Arabia	High
86	Omar, A., et al.	Female medical students' awareness, attitudes, and knowledge about early detection of breast cancer in Syrian Private University, Syria. Heliyon	2020, Syria	High
87	Osman, H. A., et al. Jothirajan, M. D.	Breast Self-examination: Knowledge, Attitude and Practice among Female Nursing Undergraduate Students in the Northern Border University, KSA.	2020, Saudi Arabia	High
88	Othman, A., et al.	Knowledge, attitudes and practices of breast cancer screening among women in Jordan.	2015, Jordan	High
89	Saca-Hazboun, H.	Knowledge and health beliefs about breast cancer screening among rural Palestinian women: pilot study.	2018, Palestine	High
90	Salem, M. A. A., et al.	Knowledge, attitude, and practice of breast self-examination among women attending primary health care facility, Menoufia Governorate, Egypt.	2020, Egypt	High
91	Salim, K. S., et al.	Breast self-examination practice among female students in Iraq.	2021, Iraq	High
92	Shkur Azeez, S.	KNOWLEDGE, ATTITUDE, AND PRACTICE TOWARDS BREAST CANCER, RISK FACTORS, AND SCREENING AMONG IRAQI WOMEN.	2021, Iraq	High
93	Sindi, R. A., et al.	Awareness Level, Knowledge and Attitude towards Breast Cancer between Medical and Non-Medical	2019, Saudi Arabia	High

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		University Stu-dents in Makkah Region: A Cross Sectional Study.		
94	Soliman, A. A., et al.	Sociocultural Barriers Related to Late-Stage Presentation of Breast Cancer in Morocco.	2019, Morocco	High
95	Suhail, N.	Breast cancer awareness, attitude, perception, and screening practices among female undergraduate students.	2021, Saudi Arabia	High
96	Suleiman, A. K.	Awareness and attitudes regarding breast cancer and breast self-examination among female Jordanian students.	2014, Jordan	High
97	Taha, H.	Voices of fear and safety: women's ambivalence towards breast cancer and breast health practices in Jordan.	2013, Jordan	High
98	Taha, H., et al.	Home visits to improve breast health knowledge and screening practices in a less privileged area in Jordan.	2014, Jordan	High
99	Taher, Y. A., et al.	Barriers for early detection of breast cancer in Libyan women in Tripoli.	2014, Libya	High
100	Yaghmour, K. A., et al.	Awareness and Knowledge of Breast Cancer Screening Methods among Women in Al-Qunfudah, Saudi Arabia.	2020, Saudi Arabia	High
101	Yakout, S. M., et al.	Awareness, knowledge and practice of breast self examination among groups of female nursing students. Riyadh, Kingdom of Saudi Arabia.	2014, Saudi Arabia	High
102	Younes, D. Z.	Breast Cancer Screening Barriers among Women in Nablus Governorate.	2015, Palestine	High
103	Younis, M., et al.	Knowledge and awareness of breast cancer among young women in the United Arab Emirates.	2016, United Arab Emirates (UAE)	High
104	Yousuf, S. A., et al.	Do Saudi nurses in primary health care centres have breast cancer knowledge to promote breast cancer awareness?	2012, Saudi Arabia	High
105	Al-Sharbatti, et al.	Breast self examination practice and breast cancer risk perception among female university students in Ajman.	2013, United Arab Emirates (UAE)	High
106	Mariam	Barriers to Breast Cancer Screening among Palestinian Women in Nablus Region, North-ern West Bank	2019, Palestine	High