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REVIEW

Breast Cancer Awareness Among Women in Saudi Arabia: A Systematic Review

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Purpose: Breast cancer (BC) is the most prevalent cancer worldwide, and second most common cause of cancer-related deaths among women worldwide. Early detection of BC significantly improves prognosis; thus, awareness is an important aspect of BC morbidity and survival as well as the economic burden. This systematic review aimed to explore awareness of BC among women in Saudi Arabia.

Patients and Methods: A systematic search was performed using Medline, Scopus, the Directory of Open Access Journals (DOAJ), and Google Scholar for all cross-sectional studies conducted in Saudi Arabia, published after the year 2000 and in English. The quality assessment of the included studies was performed using the AXIS tool.

Results: The total number of included articles after full-text assessment was 13 articles that were conducted between 2005 and 2022. The sample size of all the articles was 7,562 women. All the studies categorized BC awareness into low, moderate, and high groups. The level of low awareness among women reached 66.3% (n=2808), 13.5% (n=570) had moderate awareness levels, and 20.2% (n=858) had high awareness levels. Furthermore, 59.4% (n=1446) of the participants did not perform breast self-examination (BSE) regularly.

Conclusion: The level of awareness and knowledge regarding BC and BSE was significantly low among women in Saudi Arabia, as all included studies except one have indicated. We highly recommend and urge the implementation of effective special programs and campaigns to raise awareness regarding BC and integrating BSE into school health programs dedicated to women living in Saudi Arabia.

Keywords: breast cancer, awareness, knowledge, breast self-examination, women, Saudi Arabia

Introduction

Breast cancer (BC) is the most common cancer worldwide, and the second leading cause of cancer-related deaths in women worldwide. It represents 30% of cancers in women, with 276,480 estimated new cases and more than 42,000 estimated deaths by 2020.[1] BC is responsible for 684, 996 deaths globally.[2] Saudi Arabia is not an exception, as BC is the most common cancer in the country.[3] An epidemiological study reported that the incidence of BC in Saudi Arabia was 19.8% of all cancer cases detected in the Kingdom.[4] There are a variety of risk factors, such as sex, aging, prolonged estrogen exposure, family history, and gene mutations, that can increase the possibility of developing BC.[5] Approximately 30% of BC cases are due to modifiable risk factors, such as obesity, physical inactivity, and alcohol intake, and thus can be preventable.[6] Early diagnosis of BC is a priority because there is a higher chance of remission at an early clinical stage.[6]

Mammography remains the gold standard modality for early detection in women with average risk. Early detection allows for the diagnosis of tumors and lesions of smaller sizes, with fewer lymph node metastases and less histologic grade progression, making treatment more effective.[7] BC is mainly a histologic diagnosis based on standardized pathological criteria. The clinical evaluation of a BC patient at the time of initial presentation consists of physical examination, pathological examination of the tumor, and evaluation of the extent of disease. Several factors affect the treatment plan as it is based on the stage grade and molecular subtype of BC. Determing these factor provide an efficient,

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personalized, and safer therapy. For non-metastatic BC, two options are available either by doing breast-conserving surgery with preoperative (neoadjuvant) or postoperative (adjuvant) radiotherapy and systemic therapy. For metastatic BC the goal is to try stopping the progression of tumor spread as this type remains untreatable. The 5-year relative non-metastatic BC-specific survival rate is encouraging, with 90.3% for all BC subtypes and stages. However, for metastatic BC, the 5-year relative cancer-specific survival rate remains low, with an estimation of 29% regardless of subtype, and can drop to 12% for metastatic triple-negative BC (TNBC).[8]

Many epidemiological studies have assessed BC awareness among different populations. Most of the previous studies have found that the level of awareness is low in some Western and Asian countries.[9–11] This low level of awareness for BC is more frequently observed among women with lower educational levels.[12] Other reasons contributing to the lack of awareness include limited health education programs, especially for women living in rural areas, isolated areas, and regions with insufficient healthcare centers.[13] Local studies are not different, as an analysis of women's knowledge and attitude toward BC, with a sample size of 500 Saudi women, showed that individuals with a university degree or higher education had a higher level of knowledge than uneducated individuals, those with only primary school education or those who had intermediate or high school education.[14] While several studies have assessed BC awareness among women in different regions of Saudi Arabia, no comprehensive studies have assessed BC awareness among women from around the country.

In this systematic review, we aimed to assess the levels of awareness and knowledge of BC among women living in Saudi Arabia. This review can provide significant insights to help decision-makers establish programs and initiatives that facilitate the screening process for women in all regions of Saudi Arabia by targeting regions with low levels of awareness.

Materials and Methods

Study Registration

This systematic review was officially registered within PROSPERO (ID: CRD42023402440) and undertaken in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines, which ensure comprehensive and transparent reporting.[15]

Outcome Measures

We defined awareness of BC as encompassing knowledge pertaining to protective factors, risk factors, symptoms, signs, screening methods, and screening frequency. The majority of studies employed a self-administered questionnaire that was developed based on existing research. While certain studies utilized a validated questionnaire, others did not adhere to this practice. Some studies have reported awareness levels within distinct groups, such as high, moderate, and low levels of awareness, while others have not provided such categorizations. Most studies that used distinct groups to categorize awareness as high, moderate, or low used a scoring system to assess awareness. However, there was no standardized method to measure awareness among the included studies. Thus, in our study, we presented the level of awareness in two ways: through grouped categorizations, and by summarizing the overall findings of studies that reported awareness levels.

Eligibility Criteria

We included studies conducted in Saudi Arabia, encompassing women aged 18 years and above, into our descriptive analysis. Non-Saudi women were also included in the review. Specifically, we included only cross-sectional studies that examined BC awareness and knowledge levels among women in Saudi Arabia. We excluded studies focused on healthcare workers or healthcare university students, as well as those that involved male participants. Furthermore, studies that did not report the outcomes of interest were excluded from our analysis. To visualize the process of study selection, we have provided the PRISMA flow diagram in Figure 1.
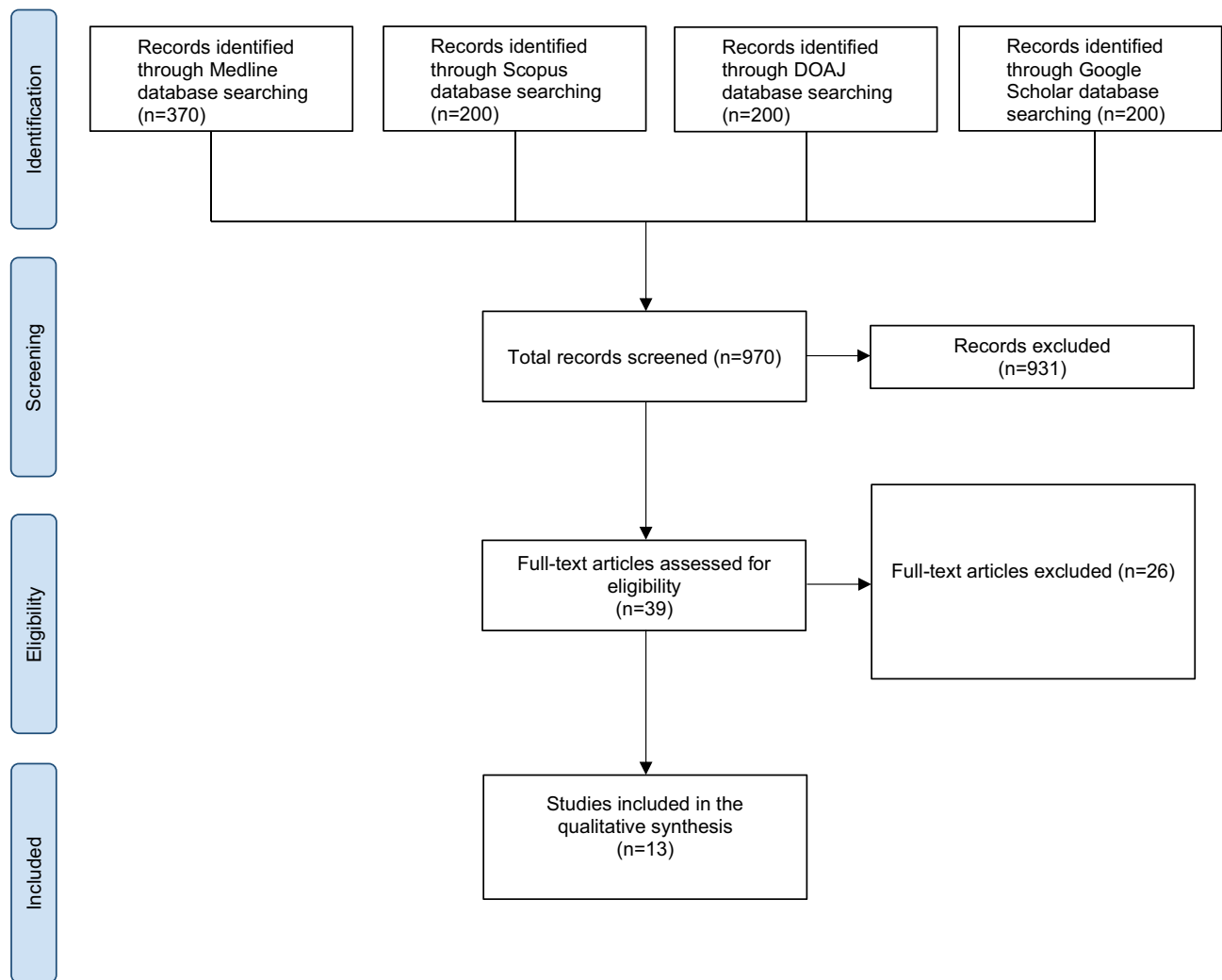
Figure 1 An overview of the study selection based on PRISMA.
Abbreviations: BC, Breast Cancer; BSE, Breast Self-Examination.

Search Strategy and Information Sources

We conducted comprehensive searches across several databases, including Medline, Scopus, Directory of Open Access Journals (DOAJ), and Google Scholar. Our search was limited to studies published in English and after the year 2000. To ensure the inclusion of relevant studies, we employed specific keywords and Medical Subject Headings (MeSH). The main keywords used were: "Breast Cancer", "Awareness", "Knowledge", "Women", "Female", and "Saudi Arabia." By employing both MeSH terms and keywords, we aimed to retrieve all relevant studies available in the existing literature on the topic.

Study Selection and Data Extraction

Following the evaluation of titles and abstracts by three independent reviewers (MHMS, AK, and SRA), a thorough examination of the full texts and data extraction was conducted for the studies that met the predetermined inclusion criteria. The same three reviewers (MHMS, AK, and SRA) were responsible for this process. In the event of any discrepancies or disagreements, The lead author (BA) was assigned to resolve conflicts and reach a consensus among the reviewers. The included articles focused on the reporting of BC awareness and knowledge levels among women in Saudi Arabia. In addition to this information, demographic characteristics such as mean age, marital status, level of education, employment status, region, family income, use of oral

contraceptives, smoking habits, and family and friends' history of BC were extracted. Furthermore, the overall level of awareness and knowledge among women was also extracted.

Data Synthesis

Due to the heterogeneity of the included studies, a meta-analysis was not possible. However, a descriptive analysis was conducted, and quantitative data are presented in tables, including characteristics of the included studies, demographic characteristics of the included participants, level of knowledge of BC, prevalence of Breast Self-Examination (BSE), summary statistics of the included participants, family history of the included participants, and the overall studies' conclusions.

Risk of Bias

To assess the quality of the included studies, we used the AXIS tool to evaluate the risk of bias. Two independent reviewers (SRA and AAA) assessed the risk of bias. The AXIS tool is a quality assessment tool for cross-sectional studies. It assesses the clarity of the study aim, the appropriateness of the methods used to achieve the study aim, the adequacy of the reported results, the reported limitations, and other considerations, such as the presence of funding, conflicts of interest, and ethical approval.

Results

Characteristics of Included Studies

Out of the initial pool of 970 studies obtained from various databases, a thorough screening process was conducted to assess their eligibility. After excluding 931 studies that did not meet the inclusion criteria, a total of 39 articles underwent a comprehensive full-text assessment. Following this assessment, only 13 articles met the criteria for inclusion in this systematic review.[16–28] All the included studies were conducted between 2005 and 2022. Moreover, one study was a nationwide study,[18] while all other studies were conducted in a single region of Saudi Arabia. The regions that had been studied were as follow: 4 studies were done in Al-Qassim region,[16,17,19,26] 3 studies were done in Riyadh region,[23,25,28] and 1 study for each of the following regions: Makkah,[21] Jeddah,[20] Najran,[27] Al-Madinah,[24] and Al-Hassa,[22] with a total of 13 studies.

The combined sample size of all the included studies in this systematic review was 7,562 participants. The individual study sample sizes ranged from 137 to 2,544 participants.[18,23] Specifically, five studies targeted the general population,[18,20,23,25,26] while five studies focused on patients.[19,22,24,27,28] Additionally, three studies specifically examined schoolteachers as their target population.[16,17,21] For more detailed information on the characteristics of the included studies, please refer to Table 1.

Quality of Included Studies

The risk of bias for all the studies included in this systematic review was evaluated using the AXIS tool. The majority of the included studies obtained a score higher than 13 out of 20, indicating a relatively low risk of bias. However, it is important to note that two studies achieved lower scores of 7[26] and 9.[23] Despite these lower scores, all the studies successfully assessed BC awareness, which was the primary focus of this review.

Outcomes

In the included studies, various demographic characteristics were extracted, including educational level, employment status, marital status, residence, and nationality. Educational level was categorized into two groups: high school or below and university or above. Among all the participants, 3,289 individuals (46.1%) fell into the high school or below category, while 3,850 individuals (53.9%) fell into the university degree or higher level of education category. Regarding employment status, participants were categorized as either employed or unemployed. Of the total sample, 2,709 participants (40.9%) were employed, while 3,912 participants (59.1%) were unemployed. In terms of marital status, 2,824 participants (37.8%) were single, and 4,654 participants (62.2%) were married. Regarding the location of

Table 1 Characteristics of the Included Studies

Study	Year Done	Sample Size	Mean Age	Region	Population
Alshahrani 2019[27]	2017	500	NR	Najran	Patients
Qedair 2022[18]	2021	2544	NR	Nationwide	General population
Al-Khamis 2018[25]	2014	290	36.5 ± 11.7	Riyadh	General population
Al-Zalabani 2018[24]	2015	465	34.9 ± 12.2	Al Madinah	Patients
Almutairi 2016[28]	2013–2014	200	NR	Riyadh	Patients
Amin 2009[22]	2008	1315	36.3 ± 8.9	Al-Hassa	Patients
Al Otaibi 2017[23]	NR	137	NR	Riyadh	General population
Alshareef 2020[21]	NR	400	NR	Makkah	School teachers
Mohammed A 2006[19]	2005	300	36.2 ± 10.2	Qassim	Patients
Radi 2013[20]	NR	200	32.3 ± 10.9	Jeddah	General population
Dandash 2007[17]	NR	376	34.7 ± 5.4	Qassim	School teachers
Alsowiyan 2020[26]	2018	519	NR	Qassim	General population
Alduraibi 2022[16]	2019–2020	316	NR	Qassim	School teachers

Abbreviation: NR, Not Reported.

residence, 3,179 participants (75.0%) lived in urban areas, while 1,057 participants (25.0%) resided in rural areas. Lastly, the vast majority of participants, 6,918 women (98.0%), were of Saudi nationality (Table 2).

The level of BC awareness reported by respondents across the different studies was categorized into high, moderate, and low. Among those whose awareness was evaluated, 858 women (20.3%) reported a high level of BC awareness, 570 women (13.5%) reported a moderate level of awareness, and 2,808 women (66.3%) reported a low level of BC awareness. Regarding the practice of BSE, respondents were classified based on their responses as either "yes" or "no", depending on whether they regularly perform BSE or not. Of the participants included in the studies, 988 women (40.6%) reported regularly performing BSE, while 1,446 women (59.4%) did not perform BSE regularly (Table 3).

Summary Statistics

The summary statistics from the included studies encompassed additional variables such as family income, having children or not, the use of oral contraceptives, and a history of BC. Family income was divided into two categories: more than 5,000 Saudi riyals and less than 5,000 Saudi riyals. Among the reported number of participants, 2,274 individuals had a family income of more than 5,000 Saudi riyals, while approximately 861 individuals had a family income of less than 5,000 Saudi riyals. Regarding having children, 1,729 participants reported having children, whereas 420 participants reported not having any children. A positive history of BC was reported by 145 participants, whereas 586 participants reported a negative history of BC. The use of oral contraceptives was reported as positive by 1,264 participants, while 1,799 participants reported never using oral contraceptives. It is important to note that these variables were reported by only some of the included studies and not all of them (Table 4).

Based on the findings of the included studies, it can be concluded that the knowledge and awareness of BC among women in Saudi Arabia are generally insufficient. All studies, except for one, have reported inadequate levels of BC awareness and highlighted the need for interventions to address this issue. One study, however, reported that the participants had a satisfactory level of knowledge and awareness regarding BC. Moreover, the majority of the included studies found that the practice of BSE was low among women in Saudi Arabia. This suggests that there is a need for promoting and improving BSE practices in this population (Table 5).

Table 2 Demographic Characteristics of the Included Participants

Study	Education*		Employment Status		Marital Status		Residence		Nationality	
	High School or Below	University or Above	Employed	Unemployed**	Single***	Married	Urban	Rural	Saudi	Non-Saudi
Alshahrani 2019[27]	297	203	107	393	149	351	NR	NR	NR	NR
Qedair 2022[18]	853	1712	759	1785	1362	1182	2014	530	2544	0
Al-Khamis 2018[25]	171	119	77	213	85	205	NR	NR	290	0
Al-Zalabani 2018[24]	290	175	158	307	308	157	NR	NR	352	113
Almutairi 2016[28]	49	125	NR	NR	51	123	NR	NR	200	0
Amin 2009[22]	1026	289	349	815	221	1094	789	527	1315	0
Al Otaibi 2017[23]	31	45	28	51	31	48	NR	NR	125	12
Alshareef 2020[21]	66	328	400	0	118	282	NR	NR	400	0
Mohammed A 2006[19]	240	60	40	247	51	249	NR	NR	300	0
Radi 2013[20]	90	102	99	101	115	85	NR	NR	200	0
Dandash 2007[17]	0	376	376	0	60	316	376	0	376	0
Alsowiyan 2020[26]	176	343	NR	NR	247	272	NR	NR	500	19
Alduraibi 2022[16]	0	316	316	0	26	290	NR	NR	316	0

Notes: *The following studies had the category "Others" in education: Alotaibi (5), Alshareef (6), Radi (8) so we removed it from the tables for clarification. **Housewives and students were considered as unemployed. ***Divorced and widowed were considered as single.
Abbreviation: NR, Not Reported.

Table 3 Participants Level of Knowledge of Breast Cancer and Prevalence of Breast Self-Examination Among Women in Saudi Arabia

Level of Breast Cancer Knowledge	N	Number of Studies that Reported the Variable
High	858	5
Moderate	570	4
Low	2808	5
Practice Breast Self-Examination (BSE)		
Yes	988	6
No	1446	6

Table 4 Summary Statistics

Variable	Number of Participants	Number of Studies that Reported the Variable
Family income		
Less than 5K	861	3
5K or more	2274	2
Children		
Yes	1729	4
No	420	3
History of breast cancer		
Yes	145	2
No	586	2
History of Benign Breast Disease		
Yes	183	4
No	2408	4
Friends' history of breast cancer		
Yes	667	3
No	2251	3
Age of menopause		
Still menstruating	1452	2
Before 50 years of age	128	2
Equal or more than 50 years of age	44	2
Unknown/not sure	191	2

(*Continued*)

Table 4 (Continued).

Variable	Number of Participants	Number of Studies that Reported the Variable
Use of oral contraceptives		
Yes	1264	2
No	1799	2
Smoking		
Yes	123	1
No	2421	1

Table 5 Participants' Family History of Breast Cancer and Studies' Conclusion

Study	Family History of Breast Cancer		Conclusion
	Yes	No	
Alshahrani 2019[27]	NR	NR	In summary, the majority of women demonstrated poor knowledge about breast cancer and screening methods. Additional effort should be put forth through women's healthcare providers to increase the awareness of breast cancer screening. That means we need to continue emphasizing the importance of primary healthcare for early detection of breast cancer in the early stages
Qedair 2022[18]	430	1855	Our study reports an alarmingly high level of poor overall breast cancer awareness in Saudi women. Interventions should be implemented to combat this lack of awareness
Al-Khamis 2018[25]	27	263	We are reporting a major gap in breast cancer awareness and several logistic and emotional barriers to seeking medical care among adult Saudi women. The current findings emphasized the critical need for an effective national breast cancer education program to increase public awareness and early diagnosis
Al-Zalabani 2018[24]	82	383	Respectively. A high level of poor knowledge about breast cancer was detected in the overall studied women and those who never received a mammography, particularly knowledge related to the risk factors of breast cancer. The most important predictors of the barriers to mammography were incorrect beliefs about mammography and its procedures. A belief that mammography is painful was significantly associated with a 56% reduction in its use (OR = 0.44; 95% CI = 0.22–0.88). The high levels of poor knowledge about cancer breast observed in this study reflect the need for greater efforts to increase breast awareness education
Almutairi 2016[28]	NR	NR	Many were aware of the opinion that proper and assisted knowledge about BSE can help in early detection of breast cancer. The patients were also aware that BSE is the most widely used method of screening for breast cancer in clinics and hospitals. All the participants showed sufficient knowledge about the risk factors and symptoms of breast cancer. These baseline findings are encouraging. For providing more self-explanatory information (to patients) and guidance to health authorities for developing effective breast health care programs in the entire Kingdom for the female population and not only for patients visiting health care clinics for advice on other medical issues
Amin 2009[22]	263	1052	Included women, irrespective of their educational status, had knowledge deficits regarding breast cancer risk factors and underutilization of the recommended breast cancer screening. Several barriers are contributing to such knowledge deficits and screening behavior.

(*Continued*)

Table 5 (Continued).

Study	Family History of Breast Cancer		Conclusion
	Yes	No	
Al Otaibi 2017[23]	NR	NR	Out of the 137, about 54% claimed they are aware of breast cancer and BSE, however, only 62% of them knew how to conduct self-examination. Far fewer were aware of mammography screening (38%). When asked about the source of breast cancer information, most of the women answered awareness campaigns (39%) while school/ university and TV (22% each) were the sources for others. This highlights the importance and urgent need for continued awareness campaigns. Moreover, special awareness sessions need to be conducted in institutions like colleges, universities, and hospitals where the proportion of females is higher
Alshareef 2020[21]	63	314	This study indicated that Saudi female teachers' level of knowledge of BC is inadequate. Introducing and developing an effective health education program in female schools within KSA is recommended
Mohammed A 2006[19]	NR	NR	This study concludes that the level of awareness of the females of Qassim region regarding breast cancer and BSE is not adequate and a health education program for this subject should be introduced in the region
Radi 2013[20]	22	178	Out of 200 participants, 50.5% were aware of breast lump as a warning sign of breast cancer, 57.5% claimed that family history was risk factor, 20.5% had undergone breast screening, 79% heard about BSE, and 47.5% knew how to perform BSE. Findings indicated that Saudi females level of awareness of breast cancer is very inadequate. Public awareness interventions are needed in order to overcome an ever-increasing burden of this disease among Saudi females
Dandash 2007[17]	45	331	The study points to the insufficient knowledge of female teachers about breast cancer and identified the negative influence of low knowledge on the practice of BSE. Accordingly, relevant educational programs to improve the knowledge level of women regarding breast cancer are needed
Alsowiyan 2020[26]	82	437	The overall knowledge of women about BC in this study was inadequate. While half of the women performed breast self-examination on the contrary, the actual clinical breast examination found to be low. The most common risk factor being identified was family history of BC and smoking. Size and shape changes of breast as well as breast lump were the most common signs and symptoms. Age group in years and the use of contraceptives pills were being identified as the significant factors of knowledge toward BC
Alduraibi 2022[16]	82	234	The breast cancer knowledge is overall insufficient regarding risk factors and clinical presentation. Improving knowledge regarding risk factors, presentation, and screening tools as BSE and mammogram through educational programs is highly recommended

Abbreviation: NR, Not Reported.

Discussion

The aim of this systematic review was to evaluate the extent of BC knowledge and awareness among women in Saudi Arabia. The findings from nearly all the studies revealed a concerning lack of knowledge among women in the country. As a result, it is essential to introduce programs and initiatives that focus on increasing BC awareness in order to promote regular annual checkups among women.

The review found that the awareness levels regarding BC and BSE were insufficient in most of the studies. According to this systematic review, approximately 20.2% of participants had a high level of knowledge about BC while around 13.5% reported a moderate level of knowledge and 66.3% had a low level of knowledge. In terms of BSE practice, about 41% of participants performed BSE. In contrast, a separate study conducted in Saudi Arabia, involving 400 Saudi female teachers, demonstrated a significant decrease in BC awareness among participants based on marital status and age. The study revealed that older married females exhibited higher levels of awareness about the disease and the screening process. These findings indicate the need for targeted interventions to improve BC awareness, especially among younger and unmarried women. By addressing the gaps in

knowledge and promoting regular BSE, it is possible to enhance early detection and improve overall BC outcomes in Saudi Arabia.[21]

A notable observation from one of the studies conducted in Jeddah, Saudi Arabia, was that more than half of the participants had attained a university-level education or higher. This study specifically examined various aspects and explored the correlation between knowledge about BC and demographic variables.[20]

The sample size for this study consisted of 200 Saudi females who were aged 20 years or older and resided in Jeddah. The findings of this study revealed that factors such as education, employment status, and marital status were significant predictors of BC knowledge and awareness of BSE. Specifically, single, employed, and highly educated females exhibited greater knowledge and awareness of BC. These findings suggest that educational attainment, employment status, and marital status play a significant role in influencing BC knowledge and awareness among women in Jeddah, Saudi Arabia. It highlights the importance of considering these demographic variables when designing targeted interventions and educational campaigns to improve BC awareness in the region.[20] In a study conducted in Riyadh with 137 participants, approximately 50% of the females were found to be unaware of BC, BSE, and mammography. Lack of education was cited as one of the primary reasons for not practicing BSE. Additionally, some females mentioned shyness as a deterrent. As for mammography, it was perceived as an annoying and costly test by some participants.[22]

The study primarily focused on urban residents; however, it emphasized that knowledge and awareness levels among women cannot be solely determined by their place of residence. In Abha, a cross-sectional study involving 1,092 women attending urban primary healthcare centers was conducted to assess their knowledge, attitudes, and practices related to BC. The findings highlighted that only 22.0% of participants were aware of mammography, a BC screening method, and 41.5% had heard of BSE.[29] Moreover, the previous studies consistently recommended the implementation of health education programs, awareness campaigns, and targeted awareness sessions conducted in various institutions. These initiatives aim to elevate the level of awareness among individuals regarding BC, BSE, and screening programs. By actively engaging in these educational efforts, it is possible to improve knowledge, promote early detection, and encourage participation in screening programs for BC.

A study conducted in Riyadh in 2015 reported that participants showed a high level of BC awareness. This may be due to several factors, including the fact that Riyadh is the capital of Saudi Arabia, and it has better healthcare and educational resources to share with patients. This study was also conducted in two private medical clinics; therefore, participants were more likely to be from a wealthy and more educated background. Furthermore, the study reported that most participants acknowledged that a family history of BC was a risk factor. This could indicate that a family history of BC may lead women to seek educational resources and early preventive measures.[28]

The inadequate level of awareness regarding BC is not limited to Saudi Arabia but also extends to other Arabic countries like the United Arab Emirates (UAE). A recent national cross-sectional study conducted in the UAE revealed that only 7.6% of women had a high level of BC awareness, while 65.8% had a moderate level, and 19% had a poor level of awareness. These findings emphasize the need for targeted awareness campaigns and educational interventions in the UAE to improve BC knowledge and promote early detection practices among women.[30] In contrast to the study conducted in the UAE, the present study found that 20.3% of Saudi women had a high level of awareness about BC, 13.5% had a moderate level, and 66.3% had a low level. This difference may be attributed to Saudi Arabia's larger population, including numerous rural areas that require targeted awareness programs to address this prevalent cancer.

Limitations

This systematic review presents a comprehensive overview of studies examining BC awareness in Saudi Arabia. It identifies areas that require greater attention in awareness campaigns. However, it is important to acknowledge the limitations of this review. Firstly, only studies published in English were included, potentially excluding relevant studies published in other languages. Secondly, the inclusion of only published studies may introduce publication bias. Additionally, most of the included studies were conducted in a single region during a specific period, utilizing small sample sizes and consecutive sampling techniques that could introduce biased results. Moreover, the use of self-administered questionnaires based on previous studies without standardized reporting tools to assess participants' BC

awareness is another limitation of this review. These limitations should be taken into account when interpreting the findings and considering future research in this area.

Conclusion

In conclusion, the majority of the studies included in this systematic review indicate that a significant proportion of women in Saudi Arabia have inadequate levels of awareness regarding BC, and few perform BSE regularly. These findings emphasize the urgent need to implement widespread education programs and awareness campaigns throughout the country. By increasing BC awareness, it is possible to reduce morbidity and mortality rates associated with the disease in the Kingdom of Saudi Arabia.

Disclosure

The authors report no conflicts of interest in this work.

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