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Awareness and Knowledge of Breast Cancer among Women in Saudi Arabia: A Literature Review

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ABSTRACT

Objectives: Breast cancer (BC) is a common disease in the Kingdom of Saudi Arabia and the world. Considered in the global context, it is the primary cancer that affects women. Due to a sharp increase in the number of cases, it has become necessary to educate and create awareness of the general population regarding the BC symptoms, risk factors, and early detection methods. The main aim of this study was to conduct a literature review of the Knowledge on BC and risk factors affecting Saudi women.

Design and methodology: studies were chosen for inclusion based on pre-identified inclusion criteria. A literature review was based on Knowledge, risk factors, barriers, misconceptions, and the resources used by the respondent, Knowledge of breast self-examination (BSE) methods and practices were conducted. The primary search of articles was in English, and it focused on studies published between 2010 and 2020.

Findings: The study's emphasis was on the respondents' Knowledge of BC. The respondents included university, medical students and patients attending primary health care centres. The university and medical students possessed better Knowledge than other respondents. In conclusion, there is a need to educate women in Saudi Arabia about BC and its prevention. Emphasis must be given on early BC detection with training on BSE methods.

Value of this review: This review highlighted sub-groups of Saudi women populations with needs to improve BC's Knowledge and awareness.

Key words: Breast cancer, Awareness, Knowledge, Breast self-examination, Saudi Arabia

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INTRODUCTION

Breast cancer (BC) is one of the most common cancers, with the number of cases increasing globally. According to the World Health Organization, although this disease occurs in developed countries, its mortality is higher in underdeveloped countries [1]. In Saudi Arabia, BC is the most common cancer, ranked the second cause of cancer deaths among Saudi women. Besides, data between January and December 2015 showed that BC was common in the Kingdom of Saudi Arabia [2]. Among all cancers, there were 1,979 female BC cases with a percentage of 16.7%, and 30.1% of all cancers were reported among women of all ages. The age-standardized incidence rate (ASR) was 24.3/100,000 in the Saudi female population. The five regions with the highest ASR per 100,000 population were in the Eastern region at 37.1/100,000, followed by the Riyadh region with 33.0/100,000, the Makkah region with 26.4/100,000, and the Northern region 25.0/100,000, and Qassim region with 21.7/100,000. The median age at diagnosis was 50 years (range, 14–108 years) [2].

Increased BC awareness will prevent one-third of new cases and improve the survival rate for another one-third of cases detected at an early stage [3]. The low survival rates in less developed countries can be explained mainly by the lack of early detection programs, resulting in a high proportion of women presenting with late-stage disease and preliminary diagnosis. However, increased awareness of and information about BC, awareness of cancer signs and symptoms, and attitudes toward detection methods are an essential part of this strategy [4].

The early detection of BC is essential as mortality increases with late detection. Besides, BC also has an asymptomatic phase where early detection by screening reduces morbidity [5]. In summary, many of the detected cases were in advanced stages [6]. Clinical breast examination and mammograms are screening tools that help in early detection [7,8]. Women should be trained, possess good Knowledge of early BC detection, perform breast self-examination (BSE) and mammography, especially women, aged 40–65 [7]. In Saudi Arabia, very few studies have been carried out to assess the awareness

of BC risk factors and screening procedures, the attitude toward the disease, and the BSE practice.

Awareness and education of individuals regarding BC are essential, as studies conducted in Saudi Arabia show a lack of education. Cultural barriers are a significant issue for health education, which affects awareness [9,10]. Women's Knowledge and views of BC play a substantial role in the treatment and health-seeking behaviors, and less Knowledge will lead to delayed case presentation with more advanced disease conditions and a poorer prognosis [11, 12]. Thus, this research aimed to assess the BC knowledge and awareness in various studies that included Saudi women to reduce the morbidity and mortality of the BC by providing younger generations with understanding and educational programs. It is noteworthy that this work aims to evaluate how far we are from the goals of the Saudi 2030 Vision, which seeks to elevate the community health status.

OBJECTIVE

This study aimed to conduct a literature review on the Knowledge, awareness, and practice of BSE among Saudi women.

MATERIALS AND METHODS

A literature review was conducted by searching the articles in English, focusing on databases and journal websites, including PubMed, Google Scholar, and ResearchGate, by hand-searching and snowballing on the references of the articles based on the inclusion criteria. Primary screening of studies was conducted by reviewing the titles and abstracts of the articles. The search of the article was conducted from August 2020 to October 2020. The vital search is based on BC awareness, Knowledge, self-examination methods, and Saudi Arabia.

Types of participants

Studies included women who were interviewed about the BSE knowledge, awareness, and practice. The study subjects represented the whole population, including students, teachers, health care workers, and primary health care (PHC) visitors.

Types of interventions

Studies evaluated women's knowledge, attitudes, and practices in different parts of Saudi Arabia toward BC.

Types of measured outcomes

Studies that included outcome measures of Knowledge, attitudes, and practices of women in different parts of Saudi Arabia toward BC.

Types of studies

Cohort, cross-sectional, case-control, and descriptive studies were reviewed.

Search strategy

Search strategy involved. The preliminary examination and registration search detailed electronic searches using electronic search engines, and hand-search/snowballing were conducted based on the inclusion criteria of the preliminary examination and registration search. Searching was limited to studies published in English between January 2010 and October 2020.

Assessment of methodological quality

The reviewers used a checklist that included the study details, authors/year, objectives, participants, context, description of interest, sources of search, number of years (duration), number and type of studies, cities of the region, analysis, outcomes assessed, results, and comments.

Data synthesis

From January 2020 to November 2020, data were based on descriptive findings in a narrative review with no meta-analysis. Two calibrated reviewers screened the initial topic and abstract based on the inclusion criteria before reading the full text. Data were extracted by the clear reading of the full text by the reviewers.

Outcome variables

Based on the standardization of the methodology quality, articles were selected based on the inclusion and exclusion criteria. The outcome variables were based on the chosen article. To maintain the uniformity of the results, they were grouped into Knowledge, awareness, and practice of BC with BSE and essential methods of prevention. Studies with a high risk of bias were excluded to reduce errors in the outcome.

Statistical analysis

The interviewer agreement was analysed using Cohen Kappa statistics with results of <1 within the agreement.

Included studies

During the search, keywords such as BC, Knowledge, the attitude of BC, practice of the BSE method for BC, and knowledge awareness of BC in Saudi Arabia. were used. The volume of articles was assessed based on the inclusion criteria, full text, and availability of the articles, and a total of 26 articles were selected.

RESULTS

A total of 26 studies (Figure 1) with 14,211 respondents aged between 12 and 70 years were analyzed. The respondents were university students, medical school students, nurses, and patients attending PHC (see Appendix). The review of the article summary with the findings was based on (1) knowledge of BC, which included the basic Knowledge, risk factors, and barriers of BC and the available resources of BC; and (2) BSE practice and Knowledge.

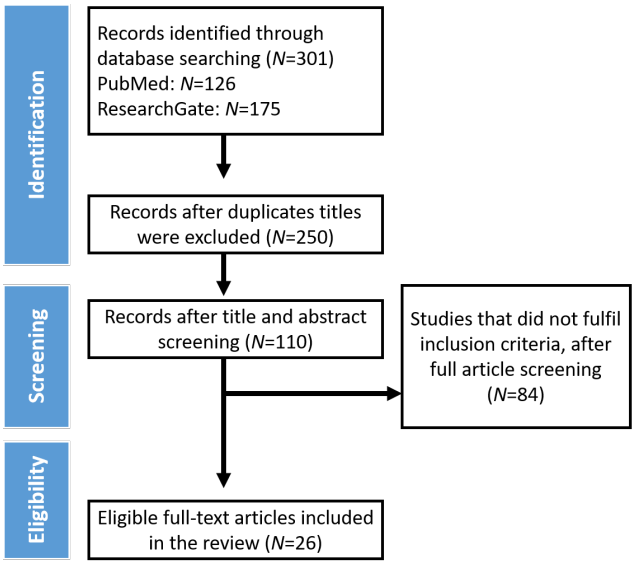

Figure 1: Summary of the search process and results of the literature review of awareness and Knowledge on breast cancer among women in Saudi Arabia.

Basic knowledge, risk factors, barriers, and educational resources of breast cancer

Based on the collective study data, the basic Knowledge included whether the respondent knew about BC; 34% of the university students responded positively [13], whereas 67.9% of the patients and their escorts were not aware of BC [4]. In a similar study, 48% of patients from the PHC were unaware of BC [8], and 66.7% of respondents with special needs were aware of BC [14]. Also, Hussein, Alorf [15] reported that 56% of the university students and homemakers perceived BC as abnormal growth. According to Latif [16] most university students showed good BC awareness. In a recent study conducted by Al Otaibi, et al. [17], the university students and the public showed that 56% of women were aware of BC. Medical students had better Knowledge of BC than non-medical students, 37.06% and 26.9%, respectively [18].

Misconceptions of BC were observed, with 27.1% of respondents believing that cancer meant the end of life and 74.2% thought it could appear overnight. In addition, 75.1% and 64.3% believed that fate and curse were the reasons for BC, whereas 25.3% of respondents believed that an evil spirit and 12.4% believed that being suspicious could cause BC [4]. The use of cosmetics was considered one of the risk factors among 37% of respondents [19].

Data on the awareness of BC risk factors were obtained from various studies conducted based on observational and cross-sectional questionnaire surveys; 76%–94% of PHC patients believed that tobacco and 80% believed that alcohol was the major BC risk factor. 54% of respondents considered excessive radiation as one of the risk factors, whereas 8.5% thought that pollution and 47% those oral contraceptives were among the risk factors [4,15,20], like observations by Hussein, Alorf [15] with 19% and Haddad, et al. [21] 38% for the exact cause; oral contraceptive. Advanced age and late pregnancy were seen as BC causes by 13% and 10% of respondents, respectively, and 46% of the common public agreed [19]. Regarding post-menopause, 48% believed that BC risk increased with it, along with being overweight (36%) [7, 19]. Genetic factors were seen as a risk factor for BC by 74% of respondents. In comparison, 42% of respondents with special needs believed the same [22], with 9.8 % with family history, 46% of university students responded the same [21,23].

Over 80% of the respondents believed that a good lifestyle, which included a good diet with fruits and vegetables (87%), breastfeeding (86%), and physical activity (84%), reduced the risk of BC [4]. A similar study reported respondents with poor diet (13%), lack of exercise (11%), and improper dressing (28%) [15]. Most respondents supported the above finding in a study conducted by Nemenqani, et al. [24] and Rasheed et al. [8]. Patients attending the PHC were unaware that BC could be curable (26%) [8]. Interestingly, 43% of respondents showed interest in genetic testing to check the risk factors, with 12% showing conditional interest for testing [25].

The awareness on the importance of mammography in BC detection ranged between 22% and 30% [7,8,23], which is in contrast with the observation among medical students (67%) [24]. The percentage of respondents who underwent mammography was 14% [25]; the use of mammography was higher in women with more than one child, and it decreased with age, as reported by Al-Wassia, et al. [26].

Considering the awareness of the BC signs and symptoms, 57% of the respondents were aware that a lump or thickness in the breast was a sign of BC, 68% responded that bleeding or nipple discharge was a sign of BC [27], and 78% of university students showed good Knowledge on the BC signs and symptoms [28]. Most participants were not aware of the necessity to seek medical help if a lump was felt in the breast [29].

Considering the question about the educational resources regarding BC awareness, university students reported television and radio at 56% and 65%, respectively [4,13], journals at 56%, newspaper 35%, and physicians 15% [13]. As a barrier for the BC referral, Al-Amoudi [22] reported shyness at 33%, unavailability of female doctors at 31%, and refusal by the family at 10%.

Breast self-examination practice and knowledge

The respondents' data showed that the Knowledge of BSE was 42% among women attending the PHC and 61% among the public compared to 92% among university students [7,16,27]. Regarding the spread of the Knowledge on BSE, Hussein, Alorf [15] reported that 70% of participants were willing to communicate with others than 30% who were fearful of spreading Knowledge on or discussing BC and 50% feared the test results [21]. Sait, et al. [23] reported that 72% of

students were very interested in a Self-breast examination training course.

Regarding the awareness of BSE methods, 4% of the nurses and 30% of respondents attending the PHC practiced the BSE methods compared to 62% of university students [7,14,21]. Regarding monthly BSE practices, 89.2% of medical students and 55% of university students confirmed carrying BSE monthly [23,24]. One of Al-Amoudi [22] studies on women with special needs revealed that 41.7% of women who were deaf and mute practiced BSE. According to Sait, et al. [23], 55% of respondents answered that BSE should be performed after the monthly period and not before, as recommended. Rasheed, et al. [8] reported that women aged ≥ 46 years practiced BSE 2 times more frequently than women in their 30s. There was a statically significant finding on the BSE practice according to which college/university-educated women were 4 times more likely to be involved than the less educated group; workers in the health care field and homemakers were almost 3.5 times more likely to practice BSE than students, but in contrast with Elsadig Yousif Mohamed, et al. [30], who found that 28% of medical students and 30% of non-medical students practiced BSE regularly [8]. A total of 5% of medical students had undergone a screening test, compared to 14% of non-medical students [18].

DISCUSSION

A total of 14,211 respondents (university students, medical school students, nurses, and patients who were attending PHC centers) aged 12–70 were included in the study. The respondents came from different parts of the Mecca, Riyadh, Hail, Taif, Abha, Asir, and Najran regions. The Knowledge of BC varied across the regions according to respondents' answers.

From the public health point of view, it is necessary to know the impact of BC in the community, as BC is one of the most common diseases both globally and in the Kingdom of Saudi Arabia [28]. Some data have revealed the rising mortality and steps needed to increase awareness and reduce morbidity and mortality rates. The present study found that awareness programs regarding the basic pathogenesis and etiology of BC and basic BSE methods were necessary, as stated by Hegazy, et al. [28], who mentioned that an increase in awareness would lead to the right message in uplifting, positive Knowledge. The present study showed data from 26 articles in which it was observed that the Knowledge of BC and basic BSE methods were higher among medical students compared to the general public or patients attending PHC, possibly because of a lack of education or available resources. The strong Knowledge among medical students can be used to create awareness among women in the community, which agrees with findings [31].

Overall, the studies revealed less knowledge of the various risk factors associated with BC. Few respondents showed misconceptions accompanied by fear, one of the significant barriers to health awareness and health promotion. This agrees with a study conducted in Kenya, which identified barriers to the awareness of BC risk factors [32]. The awareness of mammography in the detection of BC was better in medical than in non-medical students. An effective screening method using mammography is essential in early detection, as confirmed by the Cochrane study, which showed that mammography screening leads to a sharp increase in the earlier cases younger group and a sharp decrease in the number of advanced cases, which indicates a reduction in mortality and morbidity [33]. The practice of BSE was good among medical students in comparison with other groups. This finding helps to motivate medical students to practice BSE methods among themselves and their patients.

This review has a few limitations; the uniformity of the studies was not considered, as all the studies included had different designs and respondents. Since our study focused on Knowledge and awareness, this was not considered in the inclusion criteria. Thus, further meta-analysis of each research is necessary based on uniformity.

Appendix I

Table 1: Summary of findings from various studies, including the participant characteristics, conducted on the Saudi women based on the breast self-examination and knowledge of breast cancer.

No	Studies /Year	City/Region	Subjects (N, type)	Marital Status	Age in Years (mean ± standard deviation)	Summary on BSE	Summary on BC Knowledge and Awareness
1	Habib, Salman [13]	Medina	(N=247)	85.4% single	18–39 (27 ± 12.1)	64.4% did not know the proper way to perform BSE.	34% replied correctly regarding knowledge about the incidence of the disease.
			University students	10.5% married		42.2% had never performed BSE.	None of respondents expressed knowledge of the risk factors.
				4.1% divorced			51.8% knew that mammography was

							a screening tool for BC.
							Source of information about BC:
							56.2% television and radio
							34.8% journals and newspaper
							15.2% physicians
2	Ravichandran, Mohamed [4]	Riyadh	(N=719)	N/A	≥15 (38.5 ± 14.4)	Knowledge of BC was higher (significantly) in those performing BSE.	67.6% had no knowledge of BC warning signals.
			Patients or their escorts visiting PHC centers				80.7% believed some cancers could be cured if detected early.
							94.3% agreed about tobacco, and 80.4% knew that alcohol increased the risks of BC.
							86.7%, 86.2%, and 84.2% believed that intake of fruits and vegetables, breast feeding, and physical activity, respectively, would not increase the BC risk.
							75.1% and 64.3% of the participants believed fate and curse could cause BC, respectively.
							47% believed that oral contraceptives increased the risk of BC.
							27.1% believed cancer meant the end of life.
							74.2% believed cancer could appear overnight.
							Source of information about BC:
							65.1% television/ radio
							55.4% friends and relatives
							52.9% newspaper and magazines
							29.4% physicians
							7.9% other health workers
3	Sait, Al-Amoudi [23]	Jeddah	(N=337)	99% single	12–18 (16.2 ± 1.5)	61.1% of participant performed BSE.	9.8% admitted that they had a family history of BC.

			Students school & university	1% married		72.1% of the students were enthusiastic about receiving a training course to learn how to perform BSE.	30% of the subjects were familiar with mammography use in BC.
						55% answered that BSE must be carried out after the monthly period and not before as recommended.	Risk factor of BC:
							32.6% oral contraceptive pill
							60.8% radiation
							65% smoking
4	Yousuf, Al Amoudi [14]	Jeddah	(N=210)	16.2% single	22–59 (36.9 ± 8.5)	37.2% of participants never practiced BSE.	44% believed that BC could be treated if detected early.
			PHC nurses	70.5% married		4% practiced BSE monthly.	40% of the nurses believed that women did not need a mammography if they had a CBE.
				10.5% divorced		28% practiced BSE annually.	11% scored <50% of the total score for general epidemiological knowledge on BC.
				2.9% widowed			35% scored <50% of the total score for BC risk factors.
							67% scored >75% of the total score on BC signs and symptoms.
5	Al-Amoudi [22]	Jeddah	(N=48)	68.8% single	15–50 (29.73 ± 8.51)	56.3 % knew of BSE.	66.7% heard of BC.
			Special need	20.8% married		41.7% knew how to perform BSE.	Regarding the risk factors, the participants showed less knowledge on genetic factor, age, and late pregnancy (41.7%, 12.5%, and 10.4%, respectively).
				8.3% divorced			Regarding the barriers preventing participants from seeking help for early BC detection, the following reasons were listed:
				2.1% widowed		37.5% practiced BSE.	33.3% ignorance
							31.3% shyness
						70.3% did not know what the best time was to do BSE.	16.7% distance from the health care center
							16.7% unavailability of female doctors
							10.4% refusal by the family

							85.4% had less knowledge on the importance of the use of mammography.
							Source of information about BC:
							16.7% television/ radio/media
							35.4% friends and relatives
							31.3% physicians
							2.1% other health workers
6	Hussein, Alorf [15]	Hail	(N=877)	NM	12–66 (26.5 ± 8.2)	26.7% were fearful to perform the BSE.	56% perceived BC as abnormal growth.
						70% were willing to communicate with others regarding BSE based on personal awareness.	Risk factors of BC:
			All				18.8% oral contraceptive pill
						30% subjects were reluctant to communicate with others because of fear.	13.1% poor diet
							12.1% inheritance
							10.5% lack of exercise
							5.1% smoking
							4.8% aging
7	Mahfouz, Hassanein [7]	Abha	(N=1092)	NM	15–65 (33.63 ± 11.91)	41.5% heard about BSE.	22% heard about mammography.
			Patients attending PHC centers			29.7% performed BSE.	BC protective factors:
							92.8% breastfeeding
							83.6% proper nutrition
							Knowledge of BC signs and symptoms:
							66.8% changes in breast size
							58.7% heaviness under the armpit
							60.8% shape of nipples
							55.5% discharge from nipples
							Risk factor of BC:
							48.3% oral contraceptive pill
							13.1% poor diet

							74.4% hereditary
							68.5% smoking
							47.3% aging
							Source of information about BC:
							36.2% television/ radio/media
							25.1% friends and relatives
							20.1% health workers
							22.5% journals/ books
8	Rasheed and Al-Sowielem [8]	Al-Khobar	(N=600)	9.2% single	25–70 (35.98 ± 9.05)	55.4 % did not practice BSE.	48% of the women had poor knowledge on BC.
			Patients attending PHC centers	85.3% married		College/university educated women were four times more likely to be involved in the BSE practice than the less educated group.	
				5.5% divorced or widowed			24.4% were aware of mammogram screening and the BC diagnosis.
						Practice of BSE was less common among women whose perceived seriousness for BC was high in terms of the disease endangering their life (61.7% vs. 65%; $p < 0.05$) and marriage (41.9% vs. 46.7%; $p < 0.05$) and who had no hope for BC cure (12.7% vs. 19.9%; $p < 0.05$).	
							63.5% women believed that BC endangered their life, and 45% believed their married life would be affected.
						51.8% know best time for BSE	26.4% of the respondent were not aware of that BC was curable in some cases.
							Risk factor of BC:
							58.5% oral contraceptive pill
							13.1% poor diet
							51.9% hereditary
							83.2% smoking
							37.2% aging

							Knowledge of BC signs and symptoms:
							87% breast mass
							64.5% shape of the nipples
							68.5% discharge from the nipples
							Source of information about BC:
							44.1% television/ radio
							27% friends and relatives
							14.7% health care workers
							38.5% printed media
							14.4% Internet
9	Latif [16]	NM	(N=150)	92.7% single	NM (19.2 ± 0.96)	50.7% participants admitted performing BSE.	Knowledge of BC signs and symptoms:
			University students	7.3% married, divorced, or widowed			55.3% painless lump in breast
							58.7% pain in breast
							53.4% shape of the nipples
							65.3% discharge from the nipples
							Risk factor of BC:
							31.3% early menarche
							42.7% late menopause
							77.3% hereditary
							48% nulliparity
							93.3% aging
							36% oral contraceptive pill
							54% radiation
							70% breast feeding
10	Nemenqani, Abdelmaqsoud [24]	Taif	(N=378)	96.6% single	17–24 (19.9 ± 1.5)	89.2% of the participants knew that BSE was recommended to be done monthly.	Only 28.6% of the participants in the current study answered no when asked whether they knew that it was recommended to start mammography at the age of 20; however most of them knew that CBE and mammogram were early detection methods (76.2%

				and 66.7%, respectively).
	Medical students	3.4% married	84% knew that the axilla should be examined when doing BSE.	Risk factors of BC:
				58.5% oral contraceptive pill
			46.8% was aware about the correct BSE timing.	38.4% poor diet
				83.6% hereditary
			67% reported a positive response to BS.	54.8% smoking
				72.5% aging
				38.1% late menopause
				38.1% early menarche
				42.3% lack of exercise
				Knowledge of BC signs and symptoms:
				48% lump in the breast
				42.9% pain in the breast or armpit
				42.6% changes in the shape of nipples or breast
				50.20% discharge or bleeding from nipples
				41.5% change in the size of nipples or breast
				37.6% lump or thickening under the armpit
				32.5% puckering or dimpling of breast skin
				29% inverted nipples
				Source of information about BC:
				46.3% television/ radio
				9.3% friends and relatives
				30.1% healthcare workers
				42.2% lectures
				16.1% Internet

11	Alsaeed, Tunio [34]	Riyadh	(N=600)	37.2% single	19–60	58% aware of BSE.	84.7% reported their awareness of mammogram.
				57.0% married	(31.9 ± 10.49)	48.3% were familiar with BSE.	Knowledge of BC signs and symptoms
			All	4.0% divorced			62.7% change of color or texture of breast
				1.83% widowed		13.2% were regularly performing BSE.	53.7% breast pain
							70.8% presence of lump or mass
						53.5% stated that the right time to perform BSE was after the end of the menstrual cycle.	60.2% underarm lump
							51.8% nipple secretion
							58.7% changes in nipple shape
							38.3% cracks in the nipple
							49.2% increase in breast size
							Source of information about BC:
							34.2% television/ radio
							29% friends and relatives
							54% Internet
12	Abolfotouh, BaniMustafa [20]	Riyadh	(N=433)	47.6% single	18–NM (39.4 ± 7.2)	91.2% were aware of BSE.	Risk factors of BC:
			n=225 Health workers	45.2% married			58.5% radiotherapy
			n=208 Relatives	7.2% divorced or widowed		43.5% agreed the BSE must by performed monthly.	31.3% hormonal replacement
							28% obesity
						53.3% knew how to perform BSE.	67.8% physical exercise
							53.6% smoking
						47.3% did not know what the appropriate timing for BSE was.	44.6% aging
							15.9% late menopause
						74.7% stated that the age to start BSE was >18	36.5% oral contraceptive pills
							71.2% family history
						41.6% have done BSE.	

							Knowledge of BC signs and symptoms:
						74% performed BSE at home.	60.3% Nipple discharge is important.
							14.6% A lump is definitely cancer.
							74.8% breast lump
							23.6% early menarche
							73.7% sudden and abnormal changes in the breast size
							67.4% discharge from nipples
							67.6% changes in nipple shape.
							Source of information about BC:
							40.5% television
							9.9% friends and relatives
							12.7% health care workers
							54.7% educational public camping
							38.2% Internet
13	Elsadig Yousif Mohamed, Waqas Sami [30]	Majmaah	(N=325)	NM	NM	28.4% of medical students and 30.1% of non-medical students practiced BSE regularly.	37.06% of medical students had good knowledge in comparison to 26.9% of non-medical students.
							5.2% of medical students and 14% of non-medical students performed a screening test for BC.
			University students				
14	Haddad, Al-Adwani [21]	NM	(N=826)	84.3% single	NM	28% of respondents practiced BSE	Risk factors of BC:
				13.2% married			38.1% oral contraceptive pill
			University students	1.8% divorced		31% practiced BSE after the menstrual cycle, whereas 48% of them practiced BSE at any time.	36.8% poor diet
				0.5% widowed			46.2% hereditary
						Barriers to BSE practice:	44.6% smoking
						49.1% “I do not have free time.”	33.2% aging
						57.5% “I still don’t know how to do BSE.”	18.9% late menopause

						54.1% "I do not feel that I am at	10.1% early menarche
						risk of BC."	
						51.8% "I am afraid that X-ray is harmful."	Knowledge of BC signs and symptoms
						48.1% "I do not get any encouragement from my family."	53.3% lump in the breast or axilla
						17.1% "My husband did not approve my testing."	51.6% discharge or bleeding from nipples
						50.8% "I am afraid of test results."	70.5% change in the size of nipples or breast
						37.1% "I think the examination is painful."	50.6% lump or thickening under the armpit
						38% "Lack of privacy."	52.6% puckering or dimpling of breast skin
							36.7% inverted nipples
							Source of information about BC:
							34.2% television/ radio
							29% friends and relatives
							54% Internet
15	Al Otaibi, Al Harbi M Fau - Al Kahmoas [35]	Riyadh	(N=137)	18% single	18 - > 60 (NM)	54% claimed they were aware of BSE.	38% knew mammography was a screening tool.
			All	58% married		62% knew how to conduct BSE.	Source of information about BC:
				15% divorced			22% television/ radio
				9% widowed			39% awareness campaigns
16	Alrashidi, Ahmed [36]	Hail	(N=401)	NM	14–52	NM	Risk factors of BC:
					(NM)		38.1% oral contraceptive pill
			All				75.4% hereditary
							76% smoking
							33.2% aging
							37% late menopause/early menarche
							36% obesity
							83.6% radiation
17	Al-Wassia, Farsi [26]	All	(N=3245)	78% married	40–60 (NM)	NM	40% of the participants reported never having a mammogram.

			All				Mammography use decreased with age; 44% of women aged 41–50 never had a mammogram versus women aged 51–60 (33%) and women aged >60 24%).
							Mammography use was greater among women with more than one child (42%).
18	Alreshidi [37]	Hail	(N=401)	NM	14-52	56.35% of participants demonstrated moderate to good knowledge about BSE.	36.1% of the respondents had good knowledge.
					(19.9 ± NM)	86.53% stated that BSE had a preventive role.	28.2% had moderate knowledge of early detection and treatment.
			All			67.69% showed the knowledge of signs and symptoms to consider while performing BSE.	Regarding the perception of the level of media contribution to the awareness about BC, 33.9% think that media have good contribution about BC prevention and early detection.
						Source of information on BSE:	43.48% answered that the test should be done by the physicians annually.
						25.19% university program	
						24.67% seminars	52% respondent answered that mammogram should be performed annually for women older than 40.
						13.36% leaflets	
						25.96% media	
						10.79% friends	
						Method for carrying BSE:	
						41.11% in front of mirror	
						14.46% during shower	
						8.12% on bed	
						13.7% all of the above	
						22.59% none of the above	
						52.61% of the participants	

						believed that BSE had to start between 20 and 70 years.	
						34.68 % answered BSE had to be done every month	
19	Binhussien and Ghoraba [27]	Riyadh	(N=384)	68.7% married	18-55 (31.9 ± 8.6)	60.9% knew BSE and (CBE) were the methods of early BC detection.	75.8% of participants had good knowledge on BC risk factors.
				29.7% single 1.6% divorced or widowed		About 53.1% of women have heard about CBE.	Knowledge of BC signs and symptoms:
			All				57% lump or thickening in the breast
							49.2% lump or thickening in the armpit
							68% bleeding or discharge from the nipple
							44.5% pulling of the nipple
							35.9% changes in the position of the nipple
							41.1% rash of or around the nipple
							32% redness of breast skin
							43% change in the size of the breast or nipple
							53.9% changes in the shape of the breast or nipple
							43.8% pain in one of breasts or armpit
							43% dimpling of the breast skin
							Source of information about BC:
							16.4% television/ radio
							15.6% health care workers
							10.9% Internet/ printed material/ books
							20.3% social media
20	Alshareef, Yaseen [38]	Makkah	(N=400)	17.8 % single	25-55 (NM)	Performing BSE is significantly associated with high knowledge score	Risk factor of BC:
			school teachers	70.5 % married			38.1% oral contraceptive pill
				8% divorced			33.5% poor diet

				3.8% widowed			69.5% hereditary
							62.8% smoking
							26% aging
							25.3% early menopause
							5.8% early menarche
							28.3% obesity
							Knowledge of BC signs and symptoms
							65.4% painless breast lump
							48.1% changes in the size of breast or nipple
							50.9% changes in the shape of breast or nipple
							52.6% bleeding or discharge from the nipple
							42.1% pulling of the nipple
							35.6% nipple pain
							42.9% redness of breast skin
							75.2% lump under the armpit
21	Alsowiyan, Almotyri [39]	AlQassim	(N=519)	39.5 % single	18 - >40 (NM)	NM	Knowledge of BC signs and symptoms:
			All	52.4 % married			65.7% size and shape changes
				3.9% divorced			62% lump or thinking in breast or armpit
				4.2% widowed			52.6% skin changes
							52.4% breast pain
							49.1% nipple changes
							48.4% discharge from the nipple
							39.3% pain in the breast and armpit
							37.2% swelling under the armpit
							34.7% rash around the nipple
							Risk factors of BC:
							43.5% oral contraceptive pill
							77.8% hereditary
							36.4% smoking
							28.5% aging

							14.1% late menopause
							13.7% early menarche
							Source of information about BC:
							69.7% television/ Internet
							26.1% health care workers
							19.2% newspaper
							7.3% radio
							52.5% friends and relatives
22	Heena, Durrani [40]	Riyadh	(N=395)	36.2 % single	NM (34.7 ± 8.3)	93.7% aware of BSE.	Knowledge of BC signs and symptoms:
			Health care workers	60.5% married			1.8% lump in the breast
				2.8% divorced		74.2% agreed that BSE must be performed monthly.	1.5% discharge from the beast
				0.3% widowed			1.8% pain or soreness in the breast
						53.3% knew how to perform BSE.	3.3% change in the size of the breast
							1.8% discoloration/ dimpling of the breast
						80.3% agreed that the best time to perform BSE was a week after the menstrual cycle.	3.8% ulceration of the breast
							4.1% changes in the shape of the breast
						43% stated that puberty was the age to start BSE.	8.9% inversion/ pulling of the nipple
							4.1% swelling or enlargement of the breast
						74.7% had practiced BSE.	4.6% lump under the armpit
							12.4% scaling/dry skin in nipple region
						74.4% of participants carried BSE at home by themself.	
							Risk factor of BC:
							43.5% oral contraceptive pill
							1.8% hereditary

							9.1% smoking
							4.6% aging
							26.1% late menopause
							126.1% early menarche
							14.4% obesity
23	Alshahrani, Alhammam [41]	Najran	(N=500)	12 % single	NM	56.8% of participants demonstrated a low level of knowledge on BSE.	54.4% of participants demonstrated a low level of BC knowledge.
			PHC visitors	70% married		19% of participants demonstrated a high level of knowledge on BSE.	90.4% of women displayed a low
				11% divorced			level of mammogram knowledge.
				7% widowed		35% of women that attended the PHC performed BSE.	
							83.8% demonstrated a low level of knowledge related to clinical breast examination
						20.6% of women avoided BSE due to lack of training, and 17.6% were afraid of the findings.	
							10.2% of participants demonstrated a high level of BC knowledge, 1.6% for mammogram, and 4.8% for clinical breast examinations.
							19.8% of women visited their physician for a clinical breast examination, while 30.2% never had a breast screening method.
							Barriers preventing participants from seeking help for early detection
							of BC:
							9.4% pain
							26.4% no female doctors
							8.6% no facilities
							Source of information about BC:
							19.8% television/ radio/Internet

							52.4% social media
							8.8% health care workers
							6.2% magazines and newspaper
							13% other sources
24	Hegazy, Alamri [28]	Jeddah	(N=466)	3.4% married	18–24 (20.7 ± 1.2)	94.5% knew that BSE was a method for early BC detection.	78% of the students had good knowledge about the symptoms and signs of BC.
			University students (health sciences)	96.5% single		41% reported that they had practiced BSE.	75.5% of students mentioned mammography as an early screening method.
							Risk factors of BC:
							61.4% oral contraceptive pill
							50.9% poor diet
							91% hereditary
							73.8% smoking
							78% aging
							55.2% late menopause
							40.8% early menarche
							53.9% obesity
							Knowledge of BC signs and symptoms:
							91% lump in the breast
							78.8% pain or soreness in the breast
							86.3% discharge from the breast
							81.8% change in the size of the breast
							84.8% discoloration/ dimpling of the breast
							71.2% ulceration of the breast
							48.9% weight loss
							88.6% change in the shape of the breast
							80.3% inversion/ pulling in of nipple
							88% swelling or enlargement of the breast
							70.1% lump under armpit

							65.2% scaling/dry skin in the nipple region
							Source of information about BC:
							46.78% television/ radio/Internet
							6.86% books
							42.27% university lectures
							4% friends and relatives
25	Alsareii, Alqahtani [42]	Najran	(N=300)	76.67% single	NM	75% of participants knew about BSE.	91% knew that smoking causes BC.
				20.67% married		77% attended BSE educational sessions.	73.7% agreed that early detection helps in treatment.
			University Students	2.67% divorced			81% knew about mammograms.
			& Faculty				Knowledge of BC signs and symptoms:
							11.7% nipple discharge
							9.7% breast mass
							11.3% skin changes
							9% changes in the nipple shape and size
							10.3% changes in breast size
							10% changes in breast height
							5.7% axillary mass
							Source of information about BC:
							43% study
							30.7% media
							33% Internet
							17.3% patients and relatives
							11.3% health care workers
							7.3% training course
26	Alghamdi, Abukhelaif [43]	Albaha	(N=221)	75.1% single	17- >22	47.5% heard about breast BSE.	Knowledge of BC signs and symptoms
				24.9% married	(NM)		53.5% painless breast lump
			University students			74% knew how to perform BSE.	60.4% discharge or blood from nipples
							58.7% changes in shape of the nipple

	58.3% knew how often BSE should be performed.
	12.6% knew the appropriate time to perform a BSE.
	85.4% practice breast BSE.

CONCLUSION

The present study's findings suggest that it is necessary and essential to encourage and educate younger generations in major cities and small towns on the basics of BC, prevention, and BSE practice. More Knowledge on the risk factors will help to reduce BC morbidity and mortality. However, it is necessary to conduct a nationwide study on awareness and Knowledge focusing on involving all women communities in Saudi Arabia, especially those in rural cities, and plan a program for their education and training on BSE methods. There is a need for targeted awareness and practice for health regarding early screening, onsite counselling, and cost mitigation. In addition, precaution should be taken not to hurt cultural sentiments and educate the women community considering all demographic parameters and support from religious organizations. The Saudi Vision 2030 should be education, screening, motivation, and good lifestyle practices.

DECLARATION

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