ORIGINAL ARTICLE

Awareness level of breast cancer, breast self-examination, and risk factors among women in Jeddah, Saudi Arabia

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ABSTRACT

Background: Breast cancer (BC) is a leading cause of cancer-related deaths worldwide, including in Saudi Arabia. Early detection through breast self-examination (BSE) is crucial for improving prognosis. This study assessed the knowledge, skills, and practices related to BSE among women in Jeddah, Saudi Arabia.

Methods: A descriptive, cross-sectional study was conducted in Jeddah, Saudi Arabia, from 2022 to 2024. A validated, self-administered online questionnaire was distributed via social media to 381 women aged 18 years and older. Data were analyzed to determine the level of awareness, knowledge, and practice of BSE, as well as knowledge of risk and protective factors associated with BC.

Results: The study revealed that while a large majority (82.9%) of participants had heard of BSE, only 28.3% knew it should be performed monthly, and only 32.3% knew how to perform it. Only 15% of participants performed BSE monthly, with 58% reporting they had never performed it, primarily due to a lack of knowledge. Participants demonstrated good awareness of certain BC symptoms, such as changes in breast size or shape (73%), nipple discharge (71.7%), and the presence of a painless lump (80.1%). Smoking (97.9%) and family history (84.3%) were widely recognized as risk factors. Performing regular BSE (85.8%) was identified as a preventive measure.

Conclusion: While awareness of BC and BSE is relatively high among women in Jeddah, knowledge and practice of BSE remain inadequate. There is a need for targeted public health education campaigns to improve women's understanding of BSE techniques, the recommended frequency, and other relevant aspects of BC prevention and early detection.

Keywords: Awareness, breast cancer, breast self-examination, risk factors.

Background

Breast cancer (BC) is one of the most common types of cancer in the world [1] and is ranked fifth among the most common causes of death from cancer overall. According to studies in Europe and America, one in eight women is at risk of developing BC at some point in her life. In 2020, an estimated 2.3 million cases of female BC were diagnosed globally, and about 685,000 women died from the disease. Saudi Arabia is not an exception, as BC is the most common cancer in the country, an epidemiological study reported that the incidence of BC in Saudi Arabia was 19.8% of all cancer cases detected in the Kingdom [2]. BC cases and deaths are broadly distributed across world regions. Close to a quarter of all cases occurred in Eastern Asia, followed by Northern America (12.5%), South-Central Asia (11.3%), and Western Europe (7.5%). Close to half of all global BC deaths were observed in Eastern, South Central, and South-Eastern Asia combined, and North America (7.1%) and Western Europe (6.4%) ranked 5th and 6th in

terms of numbers of deaths. While 8.3% of all BC cases occurred in Africa, the continent's share of BC deaths was considerably higher (12.5% of the global deaths) [1]. With a 100% 5-year survival rate for patients in stages 0 and I, early detection and efficient treatment are essential for the prognosis of BC. Patients with stage II and stage III BC have corresponding 5-year survival rates of 93% and 72%. The prognosis, however, deteriorates when the tumor spreads; just 22% of individuals with stage IV BC survive for 5 years [3].

Breast self-examination (BSE) allows women to regularly monitor their breasts for abnormalities such as lumps, changes in skin texture, or unusual nipple discharge. Studies have shown that women who actively perform BSE are more likely to identify potential symptoms early, enabling timely medical intervention and improving survival rates [1]. However, despite its importance, BSE is not widely known or practiced in many countries, including Saudi Arabia. Cultural norms, societal pressures, and limited access to education are among the factors influencing women's awareness and adoption of BSE. Fear of diagnosis, misinformation about the disease, and lack of knowledge further contribute to delays in seeking medical care, often resulting in late-stage diagnosis with poorer prognosis, the most widely accessible method for early detection as a cost-effective and non-invasive technique [4]. This study aimed to assess knowledge and practice about BC and BSE among women in Jeddah, Saudi Arabia.

Materials and Methods

Study design and setting

This study employed a descriptive, cross-sectional design. It was conducted in Jeddah, Saudi Arabia, starting in 2022 till 2024. Jeddah, the second-largest city in Saudi Arabia, was chosen due to its diverse population and significance as a major urban center.

Study population and sampling

The target population consisted of women aged 18 years and older residing in Jeddah. A sample size of 381 participants was determined using the Raosoft sample size calculator, with a 5% margin of error, 95% confidence level, and 50% response distribution. Convenience sampling was utilized to recruit participants through various social media platforms.

Data collection tool

A self-administered online questionnaire was developed based on previous literature and adapted to the local context. The questionnaire was initially created in English and then translated into Arabic using the forward-backward translation method to ensure accuracy. It comprised four main sections: socio-demographic characteristics, knowledge and awareness of BSE, practice of BSE, and knowledge of BC risk factors and symptoms. The questionnaire was validated through expert review and pilot testing on a sample of 20 women (not included in the final analysis) to assess clarity and comprehension.

Data collection procedure

The questionnaire was distributed online using Google Forms [5]. A brief introduction explaining the study's purpose and ensuring confidentiality preceded the questions. Participation was voluntary, and informed consent was obtained from all respondents before they completed the survey. Those who rejected to participate in the study, as well as males, females not residing in Jeddah, and minors residing in Jeddah, Saudi Arabia, were excluded from the study; special criteria applied to females who are 18 years of age or older in Jeddah [6].

Ethical considerations

Ethical approval was obtained from the Institutional Review Board of DSFH with Approval No.: 315/IRB/2022. Participants' privacy and confidentiality were maintained throughout the study. No personal identifying information was collected.

Data analysis

Data were analyzed using SPSS version 25.0. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were calculated for all variables.

Study variables

The main variables examined in this study included: Socio-demographic characteristics (age, education level, marital status, employment status), knowledge of BSE (awareness, technique, frequency), practice of BSE (frequency, reasons for non-practice), knowledge of BC risk factors, and symptoms.

This comprehensive methodology allowed for a thorough examination of BSE knowledge, attitudes, and practices among women in Jeddah, providing valuable insights for public health interventions and future research.

Results

The study enrolled 381 women. The mean age as 35 years (±14), with a median age of 30 years and an age range of 18–67 years with the majority of participants were single (55.6%). In terms of education, the participants are largely well-educated, with 75.3% holding a university degree. The occupational status shows that 40.4% are students, while 31.8% are employed. The number of children that the participants have was an average of 2 children (±2), as shown in Table 1.

A large majority (82.9%) of participants have heard about BSE. Social media and awareness campaigns are the most common sources of information, either independently (21% and 23.3%, respectively) or in combination

(48.1%). Only a small percent of participants know that BSE should be performed monthly (28.3%), and only 32.3% report knowing how to perform BSE.

Less than half (41.2%) believe that BSE can diagnose BC, and almost half (47.2%) identify the correct time to perform BSE as after the menstrual cycle. The nipple was identified as a site for BSE (91.1%), the underarm (43.6%), the neck (6.3%), and the back (6.6%), as shown in Table 2.

The majority (73%) correctly identify changes in breast size or shape as a sign of BC, nearly three-quarters (71.7%) recognize nipple discharge as a symptom, the

Table 1. General characteristics of the studied population (n = 381).

General characteristics		
Age	Mean ± SD	35 ± 14
	Median (min–max)	30 (18–67)
Marital status*	Single	212 (55.6)
	Married	169 (44.4)
Education*	High school	81 (21.3)
	University	287 (75.3)
	Post-graduate	13 (3.4)
Occupation*	Student	154 (40.4)
	Not working	63 (16.5)
	Retired	43 (11.3)
	Working	121 (31.8)
No. of children*	Mean ± SD	2 ± 2
	Median (min–max)	1(0-8)

*Frequency (%).

Table 2. Knowledge about BSE among the studied population (n = 381).

Knowledge about BSE		Frequency	Percent
Ever heard about BSE	Yes	316	82.9
	No	65	17.1
Source of knowledge	Social media	80	21
	Awareness campaigns	89	23.3
	Relatives or friends	29	7.6
	Social media and awareness campaigns	118	48.1
Proper frequency to perform BSE	Never	33	8.7
	Monthly	108	28.3
	Every 6 months	106	27.8
	Yearly	123	32.3
	Several times per month	11	2.9
Having knowledge how to perform	Yes	123	32.3
	No	258	67.7
BSE can diagnose BC	Yes	157	41.2
	No	109	28.6
	Don't know	115	30.2
Proper time to perform BSE	Before menstrual cycle	51	13.4
	During menstrual cycle	20	5.2
	After menstrual cycle	180	47.2
	Don't know	130	34.1
Correct sites to perform BSE*	Nipple	347	91.1
	Neck	24	6.3

*Multiple responses were allowed for this variable, frequency (%) is presented for each response.

appearance of a painless lump in the breast or armpit is correctly identified as a symptom by 80.1% of participants, while changes in the skin of the breast or nipple are identified as symptoms by 78.2%, as shown in Table 3. The majority (58%) reported that they never performed BSE, while only 15% were performing it monthly, as shown in Figure 1. Nearly half (47.5%) reported that they do not perform it as they do not know how to perform it, as shown in Figure 2.

Participants demonstrated a high awareness of key BC risk factors. Smoking was identified as a risk factor by 97.9% of participants, making it the most recognized. Family history of BC was also widely acknowledged, with 84.3% identifying it as a significant risk. Conversely, fewer participants recognized other risk factors, such as

exposure to radiation (58.5%), inactivity and a sedentary lifestyle (26.8%), and contraceptive use (21.8%), as shown in Table 4.

Regarding protective factors, 85.8% of participants correctly identified performing regular BSEs as a preventive measure. Additionally, 59.6% associated a healthy lifestyle with reduced BC risk, while 56.2% noted the importance of physical exercise. However, only 4.5% of participants linked having a first child after the age of 30 years as a protective factor, as shown in Table 4.

Participants showed a strong understanding of treatment options, with 78.5% recognizing surgery and 74.5% identifying chemotherapy as viable treatments for BC. However, fewer participants (44.1%) were aware of radiation therapy as a treatment option. Less than half of

Table 3. *Knowledge about BC symptoms and signs among the studied population (n = 381).*

Knowledge about BC symptoms and signs		Frequency	Percent
BC is the most prevalent cancer among women.	Yes	343	90.0
	No	8	2.1
	Don't know	30	7.9
Change in breast size or shape are one of BC sign.	Yes	278	73.0
	No	55	14.4
	Don't know	48	12.6
Discharge from nipple is one of the signs of BC.	Yes	273	71.7
	No	32	8.4
	Don't know	76	19.9
Appearance of a painless lump in one of the armpits or breasts are one of BC symptoms.	Yes	305	80.1
	No	29	7.6
	Don't know	47	12.3
Change in the skin of the breast or nipple are one of BC symptoms.	Yes	298	78.2
	No	23	6.0
	Don't know	60	15.7
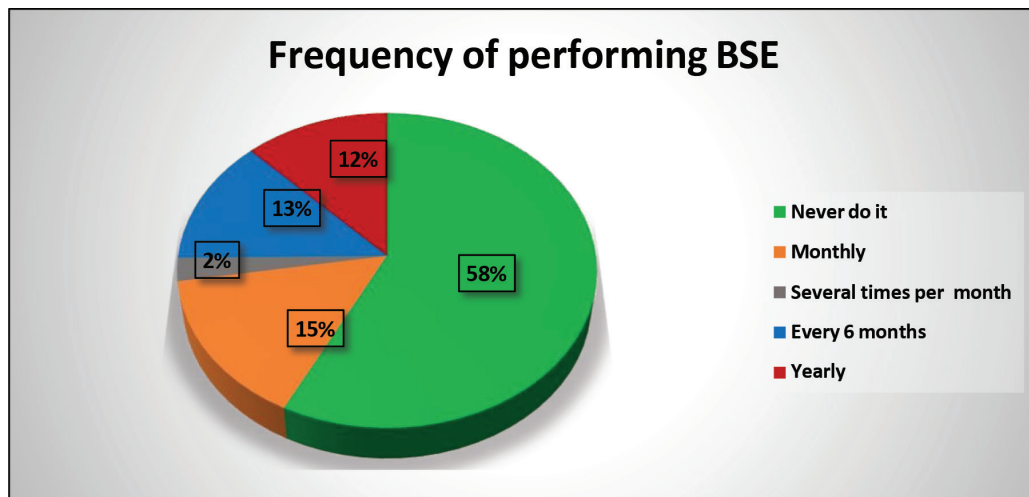
Figure 1. *Frequency of performing BSE among the studied participants (n = 381).*
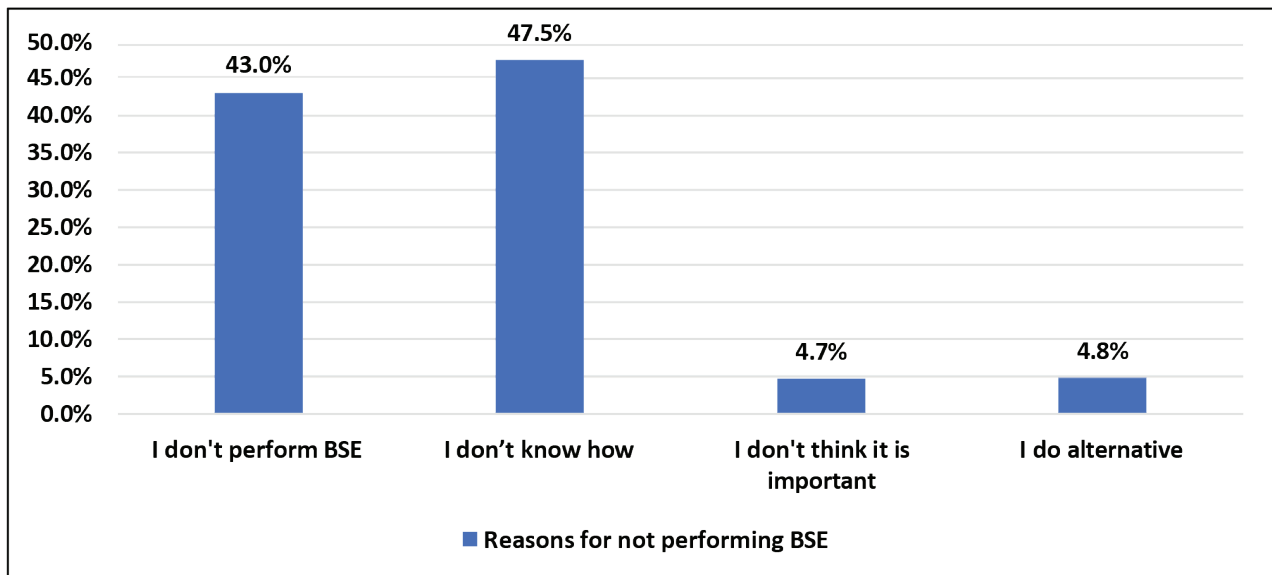
Figure 2. Reasons for not performing BSE among the studied participants (n = 381).

Table 4. Knowledge about BC-associated factors and diagnosis among the studied population (n = 381).

Knowledge about BC associated factors and diagnosis		Frequency	Percent
Risk factors*	Exposure to radiation as X-ray	223	58.5
	Inactivity and sedentary lifestyle	102	26.8
	Family history of BC	321	84.3
	Using contraceptives	83	21.8
	Smoking	373	97.9
Protective factors*	Physical exercise	214	56.2
	Having first child after age 30 years	17	4.5
	Performing BSE regularly	327	85.8
	Healthy lifestyle	227	59.6
Options for BC treatment*	Surgery	299	78.5
	Chemotherapy	284	74.5
	Radiation	168	44.1
Best method to diagnose BC	Biopsy	51	13.4
	Mammography	177	46.5
	Ultrasound	17	4.5

*Multiple responses were allowed for this variable, frequency (%) is presented for each response.

the participants (46.5%) identified mammography as the preferred diagnostic tool. Only 13.4% mentioned biopsy, while ultrasound was identified by 4.5%, as shown in Table 4.

Discussion

BC is one of the most prevalent malignancies in the world. Evaluating women's knowledge and attitudes regarding BC and BSE is important for early detection, which can lower the death rate and increase recovery possibilities. In this cross-sectional study, several demographic factors including age, marital status, education, occupation, and number of children were investigated among 381 participants to determine their influence on awareness about BC and BSE.

Our results indicate a high level of general awareness about BSE, with 82.9% of participants having heard of the practice. Awareness campaigns (23.3%) and social media (21%) are the most common information sources. This result aligned with a study of female students at the University of Sharjah [7], and another study of female students in Jordan found that the most prevalent sources of knowledge were nurses and physicians [8].

This finding is encouraging and suggests that basic information about BSE has successfully reached a large portion of the female population in Jeddah.

Just (28.3%) of participants were aware that BSE should be performed each month. Our findings were similar to those of a study among rural women in Trichy that found only (14%) of participants knew that BSE should be performed on every month [9], in one conducted among undergraduate students in Buea where it was found that (37.3%) knew that BSE should be performed monthly [10], and another study conducted in Nigeria [11], Furthermore, (47.2%) of our participants identified the correct time to perform BSE as being after the menstrual cycle, These findings are consistent with findings from similar studies conducted in other parts of the world, such as Ghana, where only (36.8%) of participants knew the proper time to perform BSE [12], and in a study conducted in Turkey (13.2%) know the appropriate time to perform BSE [13], The findings indicate that global awareness of BSE is minimal. However, we found that (32.3%) of participants knew how to perform BSE, which seems to be lower than the results of a study conducted among healthcare professionals in Saudi Arabia [14].

Therefore, this discrepancy between awareness and specific knowledge is concerning and highlights a critical gap in BC education efforts, suggesting a widespread need for more comprehensive education about BSE techniques and frequency among Saudi women.

Perhaps the most striking finding of our study is the low rate of regular BSE practice. Only 15% of participants reported performing BSE monthly, while a majority (58%) had never performed it at all, which is in line with findings from Malaysia (14.8%) [15] and Iran (18.8%) [16]. This low rate of practice is particularly worrying given the importance of early detection in improving BC outcomes. The primary reason cited for not performing BSE was a lack of knowledge, which aligns with the knowledge gaps identified earlier. This finding underscores the urgent need for targeted educational interventions that not only raise awareness but also provide detailed, practical instruction on BSE techniques.

Participants demonstrated good awareness of certain BC symptoms, such as changes in breast size or shape (73%), nipple discharge (71.7%), and the presence of a painless lump (80.1%). This level of symptom awareness is encouraging and suggests that women in Jeddah are likely to recognize potential warning signs of BC.

Regarding risk factors, smoking (97.9%) and family history (84.3%) were widely recognized. The high recognition of smoking as a risk factor is particularly noteworthy and could be leveraged in public health campaigns that link BC prevention with broader anti-smoking initiatives.

Awareness of other risk factors varied, indicating a need for more comprehensive education about BC risk. Fewer participants recognized other risk factors, such as exposure to radiation (58.5%), inactivity and a sedentary

lifestyle (26.8%), and contraceptive use (21.8%). However, our participants exhibit high awareness comparable to the study conducted in Ghana [17] and in Syria [18].

Regarding protective factors, 85.8% of participants correctly identified performing regular BSEs as a preventive measure. This finding indicates that females are aware of the disease and the role of BSE in its detection. Additionally, 59.6% associated a healthy lifestyle with reduced BC risk, while 56.2% noted the importance of physical exercise. However, only 4.5% of participants linked having a first child after the age of 30 years as a protective factor.

This study has some limitations, including its reliance on self-reported data and its focus on women in Jeddah, which may limit generalizability to other regions of Saudi Arabia. Future research could benefit from observational studies of the BSE technique, wider geographic sampling, and longitudinal designs to track changes in knowledge and practice over time.

Conclusion

This study provides valuable insights into the knowledge, attitudes, and practices related to BSE among women in Jeddah, Saudi Arabia. While awareness of BC and BSE is relatively high, there are significant gaps in knowledge about proper BSE techniques and frequency, as well as actual practice. The findings highlight a critical need for improved education and awareness campaigns to enhance BC prevention and early detection efforts. Educational efforts should focus not just on raising awareness, but on translating knowledge into regular practice. Healthcare providers should play a more active role in educating patients about BSE during routine check-ups. Public health campaigns should address the specific barriers to BSE practice identified in this study, particularly the lack of knowledge. Addressing these gaps through targeted, comprehensive education and awareness campaigns has the potential to significantly improve early detection of BC and, ultimately, health outcomes for women in Saudi Arabia.

List of Abbreviations

BC	Breast Cancer
BSE	Breast Self-Examination
DSFH	Dr. Soliman Fakeeh Hospital
IRB	Institutional Review Board
MBBS	Bachelor of Medicine, Bachelor of Surgery
SPSS	Statistical Package for the Social Sciences

Conflict of interest
The authors declare that they have no conflict of interest regarding the publication of this article.

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Consent to participate
Not applicable.

Ethical approval

Ethical approval was obtained from the Institutional Review Board of DSFH with Approval No.: 315/IRB/2022. Participants' privacy and confidentiality were maintained throughout the study. No personal identifying information was collected.

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