Breast Self-Examination As Perceived By North Private College Of Nursing Female Students: Arar City

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Breast self-examination, Breast cancer, Female nursing students, knowledge, practice3

ABSTRACT:
Background Breast Self-Examination (BSE) is an essential screening method for detecting breast abnormalities. Regular self-examination helps women become familiar with the normal appearance and feel of their breasts, enabling them to notice any changes or unusual signs over time. **Objectives** This study aimed to assess the knowledge and practices of female students regarding breast self-examination. **Methods** A cross-sectional descriptive design was adopted, recruiting 290 female nursing students from North Private College of Nursing in the Kingdom of Saudi Arabia (KSA). The participants completed a self-developed tool to assess demographic characteristics, knowledge, and self-reported practices about breast self-examination. **Results** A total of 77.6% of the female nursing students exhibited unsatisfactory knowledge and more than half reported unsatisfactory practices regarding BSE. The most commonly cited reason for not performing breast self-examination was a lack of knowledge on how to properly apply it. Furthermore, a highly significant positive correlation was found between the students' overall knowledge and their reported BSE practices ($p = 0.0001$), indicating that students with better knowledge were more likely to practice BSE. Additionally, a significant relationship was observed between students' knowledge of BSE and the level of their mothers' education, suggesting that maternal education may influence the students' understanding of BSE. **Conclusion** A comprehensive educational program should be developed at the community level to raise awareness and promote effective breast self-examination practices among female nursing students in Saudi Arabia. Additionally, further large-scale studies are required to confirm and validate the findings of this research.

Introduction

Breast cancer (BC) is a disorder characterized by the development of cancerous cells in the breast tissue, primarily within the milk ducts or lobules. While the main cause of breast cancer is unknown, several risk factors have been identified that increase the likelihood of developing the disease. These include gender, age over 50, a family history of breast cancer, lifestyle factors, and hormonal factors, such as prolonged estrogen exposure (Cohen et al., 2023). In both developed and developing countries breast cancer is the most common type of cancer and the second leading cause of mortality among women. A significant proportion of cases are diagnosed at late stages, often due to a lack of awareness and knowledge. Globally, over 1.15 million new cases of breast cancer are diagnosed every year (Sayed et al., 2022).

In Saudi Arabia, as well as worldwide, breast cancer is one of the most prevalent cancers. Most cases are detected at advanced stages, which may be attributed to limited awareness of breast

self-examination (BSE) among Saudi women (Al Rajhi et al., 2023). In the United States, breast cancer is the leading cause of death among women aged 20–59 years and the second leading cause of death, after lung cancer, in women aged 60 years and older (Siegel et al., 2022). Globally, breast cancer accounts for 11.7% of all cancer cases, with approximately 2.3 million new cases diagnosed in women in 2020 (Sung et al., 2021).

Breast self-examination (BSE) BSE is a vital tool for breast cancer detection, contributing significantly to early diagnosis and effective treatment. It is considered a cornerstone method for breast cancer screening, due to its simplicity, affordability, and accessibility. Breast self-examination is a monthly self-examination of breasts, typically performed by following the five key steps: Visual Inspection: Examining the breasts in front of a mirror for changes in size, shape, color, or contour. This is done with arms in three positions: straight at the sides, on the hips, and raised overhead. Palpation in a Standing Position: Using the pads of three fingers to feel for lumps or abnormalities in each breast. Palpation in a Lying Position: Repeating the same technique while lying down to check for any changes or irregularities (Ahmed et al., 2022).

BES is recommended as a Preventive technique for increasing breast health awareness. It is essential for women to understand their own breasts and be mindful of any changes. BSE involves regularly examining the breasts to identify any abnormalities or changes (Mossa, 2022). While BSE is not a substitute for clinical breast exams or mammograms—which should be part of a woman's regular healthcare routine—it serves as a valuable supplement to these methods. Women who practice BSE become familiar with the normal appearance and feel of their breasts, making it easier to detect any unusual changes. However, cultural and religious values in Saudi Arabia may lead many women to feel hesitant or uncomfortable about performing BSE, even for medical reasons. Therefore, educational programs targeting high school female students may be a more culturally acceptable approach to promoting BSE awareness (Sadoh et al., 2021).

In Kingdom of Saudi Arabia, breast cancer is the most common malignancy and it is increasing burden in terms of incidence, morbidity and mortality. It accounts 29% of all new cancers in women (Saudi Cancer Registry, 2021). The incidence of breast cancer has been increased in Saudi Arabia in recent years, and it is now the leading cause of cancer deaths among Saudi women. Early detection of breast cancer is important for improving the chances of successful treatment. One way that women can detect potential breast cancer early is by practicing breast self-examination (BSE) (Mohamed, et al., 2023). Few studies have examined the knowledge and practice of BSE among female nursing students in Saudi Arabia, and most of those have focused on major cities.

In the Kingdom of Saudi Arabia, breast cancer is the most common malignancy and represents an increasing burden in terms of incidence, morbidity, and mortality. It accounts for 29% of all new cancer cases among women (Saudi Cancer Registry, 2021). The incidence of breast cancer has risen significantly in recent years, making it the leading cause of cancer-related deaths among Saudi women. Early detection of breast cancer is crucial for improving the likelihood of successful treatment. One effective method for early detection is practicing BSE (Mohamed et al., 2023). However, few studies have investigated the knowledge and practice of BSE among female nursing students in Saudi Arabia, with most focusing on major urban centers.

The Saudi Arabian Ministry of Health recommends that women aged 40–50 undergo mammographic screening annually, and those above 50 years every two years. For women with a positive family history of breast cancer, mammography screening should begin 10 years before the age at which the affected family member was diagnosed (Almeshari et al., 2023). A study conducted in Saudi Arabia by Albeshan et al. (2023) evaluated the knowledge and awareness of breast self-examination among 668 female university students. The results revealed that 58.7% of participants

had poor knowledge, 37% had moderate knowledge, and only 4.2% demonstrated adequate knowledge. Similarly, a study by Alqarni et al. (2023), involving 392 participants, assessed knowledge of and attitudes toward BSE and breast cancer. The findings indicated that 92% of participants had poor knowledge, while 7.9% had good knowledge. From the investigator's perspective, it is crucial for female students to become familiar with their own bodies and to regularly examine their breasts for any changes that might indicate potential breast cancer. Therefore, this study aims to assess the knowledge and practices of female nursing students regarding breast self-examination.

Research Questions:

Q1: What is the female nursing students' level of knowledge regarding BSE?

Q2: What is the female nursing students' level of practices regarding BSE?

Method:

Study design:

This research adopted a descriptive- cross sectional design to evaluate knowledge and practices of female nursing students. This design is chosen for its efficiency in collecting data at a single point in time to examine the status and associations between the variable.

Setting:

This study was conducted at North Private College of Nursing, at Arar city, Northern Borders. The North College of Nursing is the first private college in the northern border region and includes a large number of male and female nursing students. The College building is characterized by the architectural design that represents the "falcon", which represents the identity of the northern region, and there are a lot of classrooms that can accommodate approximately 3,500 partners.

Sample size & sampling technique:

A stratified random sampling method was used to select one class from each of the first through seventh levels, with a total of 290 female nursing students. The class sizes in each level ranged from 30 to 40 students per class. These classes were chosen randomly, and then the investigator selected students from each level using simple random sampling. Only students who fit the criteria for the study were included. This sample was strategically chosen to ensure that the research findings are statistically significant and accurately reflect the students' knowledge. The inclusion criteria included Saudi nationals; female students, Nurse Specialists studying in the first through fourth year, who were willing to participate in the study.

Recruitment and participation:

The students were informed about the study through direct communication between research teams and interested students were provided with detailed information about the study's purpose, nature and procedure along with assurance of confidentiality and voluntary participation. Written informed consent was obtained from all participants before data collection commences.

Ethical considerations:

Official permission was obtained from the Ethical Committee of the North Private College of Nursing (31/1/2024) to conduct the proposed study. Participation was voluntary, each student had the right to withdraw from the study at any time without providing a reason. Written informed consent was obtained from the female nursing student's parents after explain purpose, nature and benefits of this research. It was emphasized that participation in this study was entirely voluntary, anonymity and confidentiality was assured by coding the data, and that the data would not be used in any future research without their explicit permission.

Data Collection Tools:

Based on a review of recent literature the study tools were developed by the researchers. One tool was used and the questionnaire is composed of three sections

1st part: - Demographic characteristics included eight questions related to age, educational level, family income, parents' education, parents' occupation, family history of breast cancer, etc……

2nd part: - Female student's knowledge regarding BSE included sixteen questions about purpose of BSE, source of information, methods of BSE, time, and warning Signs, etc……

Scoring system of Female student's knowledge: -

A complete answer was given 2 marks, an incomplete answer was given 1 mark, and an unknown answer was given 0 marks. The total knowledge score was calculated by summing the correct responses to all questions. Knowledge was categorized as unsatisfactory if the total score was less than 75%, and satisfactory if the score was 75% or higher (Prakash et al., 2022).

3rd part: - Female student's Self-reported practices included eleven questions about technique of BSE such as examining under the shoulder, assessing lump, using different position during examination, using use of the three finger pads during palpation, etc……

Scoring system of Female student's Self-reported practices: -

Each activity was checked as either "done" or "not done." If the proper action was performed, 1 mark was awarded; if not, 0 marks were given. The total scores were summed and converted into a percentage. Total practice was categorized as satisfactory if the score was greater than 50%, and unsatisfactory if the score was less than 50% (Alqarni et al., 2023).

Validity and Reliability:

Content validity of the study tool was assessed by a panel of five expert professors in community health nursing, maternity health nursing at North Private College, and biostatistics. They reviewed the items to ensure that each was relevant, applicable, and clear. Based on their feedback, some modifications were made to the tools, and the pilot sample was excluded. The alpha coefficient was calculated to quantify the degree of agreement between the experts' ratings of the items. A coefficient of 0.00 indicated no agreement, while a coefficient of 1.00 indicated complete agreement. Cronbach's Alpha was used to determine the internal consistency of the developed tool, with a reliability coefficient of 0.80 for knowledge and 0.94 for practices.

Statistical Analysis of the data:

The data were coded, scored, tabulated, and analyzed using Statistical package for Social Science (SPSS windows) version 27. Numerical data were expressed as mean ± standard deviation (SD) and range, while qualitative data were expressed as frequency and percentage. For Qualitative data, comparison between two variables was conducted by using chi-square test. Relations between different numerical variables were tested using Pearson's correlation. A p-value less than 0.05 was considered statistically significant and a p-value less than 0.001 was considered as highly significant.

Results:

Table (1): Female nursing students' Demographic characteristics (N=290)

Variable	**N**	**%**
Student's age		
<20	53	18.3
20-<25	179	61.7
25-<30	50	17.2
30-<35	8	2.8
Mean age ± SD	**22.2±3.4**	
Family income		
Just meet routine expenses	109	37.6
Doesn't meet routine expenses	24	8.3
Meet routine expenses and emergency	157	54.1
Father's education		
Don't read or write	22	7.6
Read & write	50	17.2
Primary education	23	7.9
Secondary education	74	25.5
University education	93	32.1

Postgraduate	28	9.7
Father's occupation		
Not working	52	17.9
Governmental work	136	46.9
Own business	27	9.3
Retired	33	11.4
Others	42	14.5
Mother's education		
Don't read or write	45	15.5
Read & write	31	10.7
Primary education	23	7.9
Secondary education	53	18.3
University education	122	42.1
Postgraduate	16	5.5
Mother 's occupation		
House wife	179	61.7
Employee	94	32.4
Retired	5	1.7
Others	12	4.1
Family history of BC		
Yes	17	5.9
No	273	94.1

Table 1 provides a comprehensive demographic characteristic of 290 female nursing students. The age distribution of the student ranges from less than 20 to less than 35 years with a mean age of 22.2±3.4 years. More than half of the students within 20-<25 years. Concerning family income, table 1 clarifies that, 37.6 % of the students had income just meeting the routine expenses while only 54.1% of them had income just meeting the routine expenses and emergency. Regarding education, 32.1% of the student's fathers were highly educated while only 7.6 % of them can't read and write. Nearly half of their fathers had Governmental work. 42.1 % of their mothers were highly educated and 61.7% of them were house wives. The minority of the students were having positive family history of breast cancer.

Table (2): Source of information about BSE (N=290)

Variable	N	%
Source of information about BSE		
Doctors and nurses	118	40.7
Relatives	16	5.5
Mass Media	47	16.2
Internet	79	27.2
Other	30	10.3

Regarding sources of information, 40.7% of the students obtained their information from the health care team as doctors and nurses, 27.2 % of them got their knowledge from internet while16.2% of them about mass media.

Table (3): Student's knowledge regarding breast self-examination(N=290)

Variable	N	%
Age at menarche		
9- <11	35	12.1
11- <13	114	39.3
13- <15	127	43.7
Other	14	4.8
Have you heard about BSE		
Yes	273	94.1
No	17	5.9
Age of BSE starting		
<20	85	29.3
20- <25	101	34.8
25- <30	46	15.9
30- <35	41	14.1
Other	17	5.9
Correct time for performing a monthly BSE		
3- 5 days After menses	31	10.7
2-3 days Before menses	177	61.0
During menses	38	13.1
Yearly	44	15.2
BSE methods		
Observation	18	6.2
Palpation	16	5.5
Both	256	88.3
BSE done to detect any abnormality		
Yes	216	74.5
No	74	25.5

Table 3 shows that 43.7% of the students had menarche at age13-<15 years. The majority (94.1%) of the students heard about BSE, 29.3% of them mentioned that starting age for breast self- examination were less than 20 years and one quarter were ranged from 20- <25years. More than half (61.0%) of them reported that it should be done after menses, while 15.2% them reported that it should be done yearly. 88% of the students reported that both palpation and observation were used as BSE methods. Regarding the purpose of breast self- examination, nearly three quarters (74.5) of them mentioned that it should be done to detect any abnormality.

Table (4): Student's knowledge regarding breast self-examination (N=290)

Variable	**N**	**%**
Have you ever practiced breast self-examination before		
Yes	222	76.6
No	68	23.4
Do you perform breast self-examination (BSE) regularly		
Yes	37	12.8
sometimes	134	46.2
No	119	41.0
BSE should be in front of a mirror		

Yes	180	62.1
No	27	9.3
I don't know	83	28.6
Observe for the change in breast size, color and texture		
Yes	171	59.0
No	43	14.8
I don't know	76	26.2
BSE should be in lying position		
Yes	78	26.9
No	110	37.9
I don't know	102	35.2
Axillary examination is a part of BSE		
Yes	162	55.9
No	22	7.6
I don't know	106	36.6
Inverted nipple is a warning sign for breast cancer		
Yes	126	43.4
No	23	7.9
I don't know	141	48.6
Abnormal discharge from the breast is a warning sign		
Yes	188	64.8
No	60	20.7
I don't know	42	14.5
Lumps in the breast is early sign for breast cancer		
Yes	161	55.5
No	22	7.6
I don't know	107	36.9

With regard to practice of BSE, more than three quarters (76.6%) of the students reported that they have practiced BSE & the minority (23.4%) of them had never practice BSE. The minority (12.8%) of the students reported that they performed the examination regularly. 62.1% of the students performed the examination in front in the mirror and the minority of the students didn't perform in front of the mirror. Concerning breast observation, more than half (59.0%) of them reported that they observed the changing in the breast size, color and texture. More than one third of them mentioned that BSM shouldn't be in lying position.

Regarding the warning signs, more than half (55.5 %) of the students reported the breast lump and inverted nipples (43.4 %) as warning signs for breast cancer, and nearly two-thirds (64.8) of them reported discharge from the nipple.

Figure 1 reveals that 77.6% of the students had an unsatisfactory level of knowledge about BSE. This finding supports the first research question.

Figure (1): Percentage distribution of student's total knowledge levels (N=290).

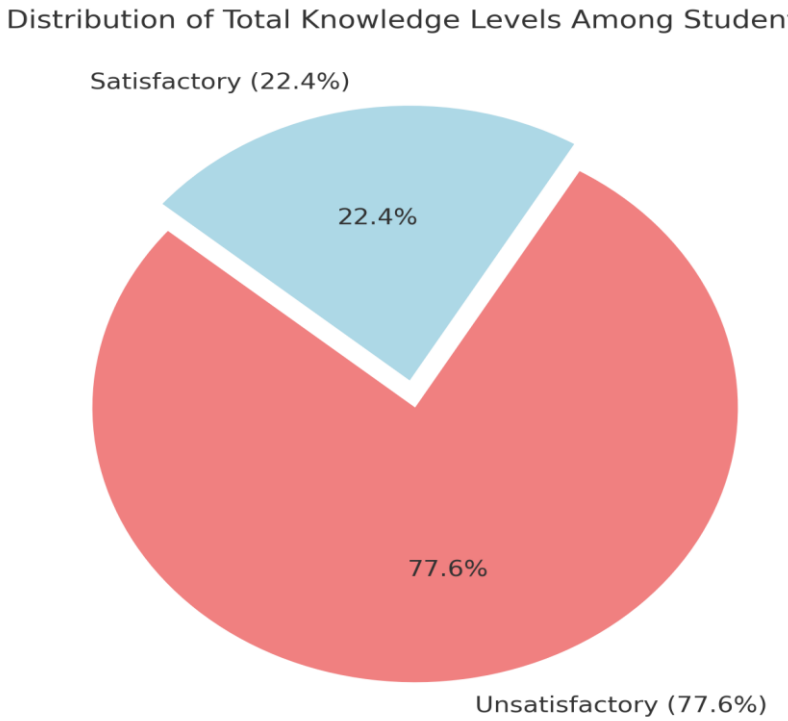

Table 6 shows that nearly half of the students examined the breasts at end of the menstrual period. 58.3 % of the students who performed BSE in front of a mirror with arms raised over head & 37.9% of them looked at breasts in mirror with arms at sides & hands on thigh. More than half (56.2 %) of them looked for swelling, dimpling of skin, or changes in nipple. 36.9% Placed pillow under shoulder before examining breast on that side. More than half (56.2%) of them examined their breasts while they were lying down and placed their hand above head before examining breasts on that side. More than half (59.3%) of them reported that used right hand to examine left breast and left hand to examine right breast and nearly half (48.3%) of them examined one breast at a time. 56.9% examined the breast in a circular motion, clockwise, from the outside to the inside. 42.4% of them reported that when examining breast, they felt for lumps, hard knots, or thickening. Only 41.7% of them squeezed the nipple to check for any discharge.

Table (6): Percentage distribution of Student's practices regarding breast self-examination (N=290).

Variable	N	%
Examining breasts at end of the menstrual period		
Done	133	45.9
Not Done	157	54.1
Look at breasts in mirror with arms raised over head		
Done	169	58.3
Not Done	121	41.7
Look at breasts in mirror with arms at sides & hands on thigh		
Done	110	37.9
Not Done	180	62.1

When looking at breast in mirror, looking for swelling, dimpling of skin, or changes in nipple		
Done	163	56.2
Not Done	127	43.8
Examine breast while lying down, Place pillow under shoulder before examining breast on that side		
Done	107	36.9
Not Done	183	63.1
Examine breasts while lying down, place hand above head before examining breasts on that side		
Done	127	43.8
Not Done	163	56.2
Use right hand to examine left breast and left hand to examine right breast		
Done	172	59.3
Not Done	118	40.7
Examine one breast at a time		
Done	140	48.3
Not Done	150	51.7
Examine the breast in a circular motion, clockwise, from the outside to the inside		
Done	165	56.9
Not Done	125	43.1
When examining breast, feel for lumps, hard knots, or thickening		
Done	123	42.4
Not Done	167	57.6
Gentle squeeze the nipple to check for any abnormal discharge		
Done	121	41.7
Not Done	169	58.3

Table (7): Percentage distribution of student's total practice levels (N=290).

Table 7 indicates that, 52.4% of the students had unsatisfactory practice while 47.6% had satisfactory practice. This table supported the second research question.

Total Practices	**N**	**%**
Unsatisfactory	152	52.4
Satisfactory	138	47.6

Table (8): Correlation between total knowledge and total practice scores (N=290).

Scores	Total practice score	
	r	P
Total knowledge score	0.54	0.0001*

* Correlation is significant at p-value <0.05

Table (8) clarifies that, there was a highly statistically significant positive correlation between students' total knowledge and total practice scores (p=0.0001*).

Table (9): Correlation between education and total knowledge and practice (N=290).

Education	knowledge		practice	
	r	p	r	p
Father education	0.04	0.42	0.06	0.28
Mother education	0.13	0.02*	0.01	0.78

*Significant at p-value<0.05

Table (9) clarifies that, there was a statistically significant positive correlation between students' total knowledge and mother education (p=0.02*).

Discussion

Central to the entire oncology discipline is the early detection and management of BC, and in Arab countries, including Saudi Arabia, it has become a central issue in the healthcare sector. BSE is fast becoming a key approach for early detection of BC, which plays a major role in improving quality of life (QOL); controlling mortality rate; and saving wasted funds of the healthcare budget, such as on avoidable surgical management, chemotherapy, and radiotherapy (Alotaibi, J., et al., 2022).

Regarding age, more than half of the students (53%) were aged 20–<25 years. These results differ from the findings of Nuhu and Ngaski (2020), who conducted a study on 237 female undergraduate students in Nigeria to assess their knowledge, attitude, and practice of breast self-examination. Their study found that the majority of respondents were between 21 and 25 years old.

Emerging scientific evidence recommends that the correct time to perform a monthly BSE is 3 to 5 days after menstruation begins (World Health Organization, 2023). However, in the current study, nearly two-thirds (61%) of the students believed that BSE should be performed 2–3 days before menstruation. Contrarily, findings from a study in Pakistan (Zahid et al., 2018) indicated that only one-third of females stated that BSE should be performed a week after menstruation. Similarly, a study in Ethiopia (Dinegde et al., 2020) reported that one-third of female university students believed the best time for BSE was 2–3 days after menstruation. These discrepancies across studies may be attributed to inconsistencies in the sources of information regarding BSE in different regions.

Regarding education and family history of breast cancer (BC), only a minority of students reported having a family history of BC. This finding aligned with the study conducted by Abo Al-Shiekh et al. (2021) on 86 students in Gaza, which assessed breast cancer knowledge and the practice of breast self-examination. That study found that less than one-quarter of participants had a family history of BC. This may be due to increased awareness and advice from healthcare providers, which could encourage individuals at risk to practice breast self-examination for early detection.

Concerning sources of information, 40.7% of the students in the current study obtained their knowledge from healthcare teams, such as doctors and nurses. This finding is consistent with a study by Joyce et al. (2020), conducted on 386 students in Eastern Uganda, which reported that 55.9% of participants received information from health workers

Concerning the findings, the majority of students had previously heard about breast cancer. This result aligns with the study conducted by Ben El-Fakir et al. (2024) on 437 undergraduate female students in Morocco, which found that all participants had heard about breast cancer.

Regarding the age for starting breast self-examination (BSE), more than one-quarter of students indicated an age of less than 20 years, while more than one-third cited the age range of 20–<25 years. This finding is consistent with the study by Kaphle (2023) on 262 participants in Nepal, which found that one-quarter of participants identified 20 years as the starting age for BSE.

With regard to BSE methods, 88% of students in the current study reported using both palpation and observation as methods for BSE. This finding contrasts with the study conducted by Mihret et al. (2021) in Northwest Ethiopia, which reported that only 28.6% of participants used both inspection and palpation as BSE methods.

Regarding the practice of BSE, nearly one-quarter (23.4%) of students reported not practicing BSE. This finding contradicts the study by Muhsin et al. (2022) in Malaysia, where 69.3% of participants reported practicing BSE. The low practice rate in the current study could be attributed to a lack of information about BSE.

Concerning performing BSE regularly, a minority of students reported performing the examination regularly. This result aligns with the study by Koc et al. (2019) in Turkey, which found that only 33.3% of participants practiced BSE regularly.

Finally, regarding performing BSE in front of a mirror, a minority of students did not perform the examination in front of a mirror. This finding is consistent with the study by Alomair et al. (2020) in Saudi Arabia, which reported that 10% of participants did not use a mirror while performing BSE.

Regarding breast observation, more than half (59.0%) of the participants reported observing changes in breast size, color, and texture. This finding aligns with the study conducted by Salloum, M., et al. (2024), which assessed the knowledge of female nursing students regarding breast self-examination (BSE). In their study, 80% of participants reported observing unusual changes in the shape, color, and size of the breast.

The current study also found that more than one-third of the participants believed that BSE should not be performed while lying down. This finding contradicts the study by Shahid, S., et al. (2024), which assessed the knowledge and practices of BSE among 138 nursing students in Pakistan. They found that 82.6% of participants disagreed with the notion that BSE should not be performed while lying down.

Concerning warning signs, more than half of the students (55.5%, 43.4%, and 64.8%, respectively) identified breast lumps, inverted nipples, and nipple discharge as warning signs of breast cancer. These findings are generally consistent with the study by Sarker, R., et al. (2022) in Bangladesh, which assessed the knowledge of breast cancer and BSE practices among 400 students. They reported that 48% and 29% of students identified lumps in the breast and inverted nipples as warning signs of breast cancer.

Regarding the total knowledge score, 77.6% of the students in the current study had an unsatisfactory level of knowledge about BSE. Similarly, Khonji, L., et al. (2024) conducted a study in Karbala, Bahrain, with 375 students, and found that 69.6% had poor knowledge of BSE. This result is consistent with the findings of Albeshan, S., et al. (2023), who reported that female students at Saudi universities demonstrated inadequate knowledge of BSE.

The current study found that nearly half of the students examined their breasts at the end of their menstrual period. This finding contradicts the study by Fouelifack, F., et al. (2021) in Cameroon, which involved 402 participants and assessed knowledge, attitudes, and practices related to BSE. Their study found that 89.5% of participants were unaware that BSE should be performed after the menstrual period.

The current study also reported that 58.3% of the students performed BSE in front of a mirror with their arms raised overhead, and 36.9% placed a pillow under their shoulder before examining the breast on that side. These findings contradict the study by Maitanmi, J., et al. (2023) in Nigeria, which involved 160 respondents and assessed awareness and practices of BSE. They found that 66.3% of respondents never examined their breasts in the mirror with their hands raised overhead, and 50% sometimes examined each breast while lying down with a pillow under the shoulder of the breast being examined.

On the other hand, more than half (56.2%) of the students in the current study did not know that they should lie down and place their hand above their head before examining the breast on that side. This finding contrasts with the study by Rane, M.A. (2019) in India, which involved 150 respondents and assessed knowledge and practices of regular BSE. Their study found that 24.13% of participants examined their breasts while lying down, with their hand placed above their head before examining the breast on that side.

The current study also found that 37.9% and 56.2% of the students looked at their breasts in the mirror with their arms at their sides and hands on their thighs, respectively, while checking for swelling, dimpling of the skin, or changes in the nipple. These findings contradict the study by Galary, K. (2020), which assessed BSE practices among 200 participants in Duhok. They found that only 9% and 16.5% of participants looked at their breasts in the mirror with their arms at their sides or checked for swelling, dimpling of the skin, or nipple changes.

Additionally, more than half (59.3%) of the students in the current study reported using their right hand to examine the left breast and their left hand to examine the right breast, while nearly half (48.3%) examined one breast at a time. This finding aligns with the study by Workineh, M., et al. (2021), which assessed BSE practices among 420 participants in Ethiopia. Their study found that more than a quarter of participants used their right hand to examine the left breast and their left hand to examine the right breast.

Regarding examination techniques, 56.9% of the students in the current study examined their breasts in a circular motion, clockwise, from the outside to the inside. These findings contradict the study by Maitanmi, J., et al. (2023) in Nigeria, which found that only a minority of participants examined in a circular motion or followed a pattern that allows them to cover the entire breast.

On the other hand, 42.4% of the participants reported that when examining their breasts, they looked for lumps, hard knots, or thickening. This finding aligns with the study by Albeshan, S. (2023), which assessed the knowledge and awareness of breast self-examination (BSE) among 668 female university students in Saudi Arabia. In that study, 72% of participants were aware of abnormal breast changes, such as secretions, lumps, skin pitting, or hard knots and thickening.

Regarding the total score for practice, 52.4% of the students in the current study had an unsatisfactory level of practice regarding BSE. This finding contrasts with a study conducted by Awogbayila, M. (2023) in Nigeria, which revealed that 58.51% of participants demonstrated good BSE practice. The discrepancy between these results may be attributed to substantial differences in the participants' knowledge levels, as well as variations in the study populations. A lack of knowledge, along with inconsistent sources of information, was one of the most frequently reported barriers to performing BSE.

Conclusion:

The current study highlights that female students' knowledge and practice of breast self-examinations (BSE) are inadequate. Therefore, there is an urgent need to implement a women's health information campaign targeted at adolescent females to raise their awareness of BSE. A well-designed educational program on early detection methods for breast cancer, including BSE, could help increase awareness before they reach the age for mammography screening.

Limitations and recommendations:

One limitation of this study is that it was conducted at only one college, making it difficult to generalize the results to other colleges in Saudi Arabia. Future studies similar to this one, conducted among nursing students at other universities across the country, are recommended. Additionally, this was a cross-sectional descriptive study design, which does not support causal inferences, limiting the ability to determine cause-and-effect relationships.

Given these limitations, it is recommended to develop a comprehensive educational program at the community level to enhance awareness and promote successful breast self-examination practices among nursing students in Saudi Arabia. Furthermore, large-scale studies are needed to confirm the results of this study.

Conflict of interest:

The authors declare no conflict of interest for the study.

Data availability statement:

The data that support the findings of this study are availability from the corresponding author upon reasonable request.

REFFERENCES

1. Ahmad, S., Alloubani, A., Abu-Sa'da, R., & Qutaiba, Y., (2022). Breast Self-Examination: Knowledge, Practice, and Beliefs Among Females in Jordan. 2022 Jan-Dec; 8: 23779608221124517.Published online 2022 Oct 5. doi: 10.1177/23779608221124517. PMCID: PMC9549095.
2. Abo Al-Shiekh, S., Ibrahim, M., and Alajerami, Y., (2021). Breast Cancer Knowledge and Practice of Breast Self-Examination among Female University .Students, Gaza. Scientific World Journal. 2021; 2021: 6640324.
3. Albeshan, S., Shubayr, N., Alashban, Y., (2023). Assessment of Knowledge and Awareness About Breast Self-Examination Among University Female Students. Breast Cancer: Targets and Therapy, Volume 2023:15 Pages 91—99 DOI https://doi.org/10.2147/BCTT.S396903.
4. Alomair, N., Felemban, D., Felemban, M., Awadain, J., Altowairqi, A., Alfawzan, N., Almazayen ,F., Korkoman, A., Alrusayyis, N., (2020). Knowledge, attitude, and practice of breast self-examination toward breast cancer among female students at King Saud University in Riyadh, Saudi Arabia Abdullah. International Journal of Medicine in Developing Countries. 4(2):429–434. https://doi.org/10.24911/IJMDC.51-1576668182.

5. Alotaibi, J., ElRazkey, J., Albougami, A., Alrasheadi, B., Almansour,A., Alasiry,SH., Yahia, A., Alanzy,W., Alotaibi,KH., Alqahtani, M., Alfaisal, A., Alotaibi, F., Alotaibi, A., and Almudhaybiri, M., (2022). Knowledge and practice of breast self-examination among female nursing students at Majmaah University. International journal of advanced and applied sciences. 9(5) 2022, Pages: 166-171.
6. Almeshari, M., Alzamil, Y., Alyahyawi, A., Abanomy, A., Althmali, O., Al-Enezi, M., Osman, H., Khandaker, M., (2023). Awareness level, knowledge and attitude towards breast cancer among staff and students of Hail University, Saudi Arabia. 2023; 18(3): e0282916. Published online 2023 Mar 15. doi: 10.1371/journal.pone.0282916.
7. Alqarni, A., Elhanafey,S., Ahmad, K., Abojameelah, Sh., Algharib D., and Elmashad, H., (2023). Knowledge, Attitude and Practice of Female toward Breast Self- Examination at Abha City. Egyptian Journal of Health Care, 2023 EJHC Vol 14. No.2.
8. Alqarni, G., Musslem, M., Alosaimi, R.,Filfilan, F,M Qarni, A., & Rizk ,H., (2023) Awareness of and Attitude to Breast Self-Examination and Breast Cancer Among Females, Saudi Arabia. 15(3): e36595. doi:10.7759/cureus.36595.
9. AlRajhi, B., Aljadani, F., Almarwan, Sh., Alzahrani, A., Sindi, M., Kano, A., and Rasha Baaqeel, R., (2023). Breast Cancer Awareness Among Women in Saudi Arabia: A Systematic Review. Breast cancer target and therapy, 2023; 15: 913–924.
10. Awogbayila, M., Onasoga, O., Jibril, U., Oluwafemi, F., Orok, E., (2023). Assessment of breast cancer risk perception, knowledge, and breast self-examination practices among market women in Owo, Ondo State, Nigeria. BMC Womens Health 2023; 23(1): 556. http://dx.doi.org/10.1186/s12905-023-02711-7 PMID: 37891548.
11. Ben El-Fakir M, Aimrane A, Laaradia MA, Ait Taleb K, Issaoune MO, Lahouaoui H, El Khiat A, El-Mansoury B, Kahime K, Elmourid A, et al. Awareness about Breast Cancer and Breast Self-Examination among Undergraduate Female Students at the University of Agadir, Morocco: A Cross-Sectional Descriptive Study. *Epidemiologia*. 2024; 5(3):385-401. https://doi.org/10.3390/epidemiologia5030028.
12. Cohen, SY., Stoll, CR., Anandarajah, A., Doering, M., and Colditz, GA., (2023). Modifiable risk factors in women at high risk of breast cancer: a systematic review. Breast Cancer Res 2023; 25(1): 45 . http://dx.doi.org/10.1186/s13058-023-01636-1 PMID: 37095519.
13. Dinegde, NG., Demie, TG., & Diriba, AB., (2020). Knowledge and practice of breast self-examination among young women in tertiary education in Addis Ababa, Ethiopia. Breast Cancer 2020; 12: 201-10. http://dx.doi.org/10.2147/BCTT.S279557 PMID: 33177868.
14. Fouelifack, F., Binyom, R., Ofeh, A., Fouedjio, J., & Mbu, R., (2021). Knowledge, Attitude and Practice of Breast Self-Examination amongst Women in Two Communities of Cameroon. Journal of Obstetrics and Gynecology, Vol.11 No.6.
15. Galary, M., Abdullah, R., & Majid, R., (2020). Practicing Breast Self-Examination Related Knowledge among Women at General Hospitals in Duhok City. Mosul Journal of Nursing. Vol.8, No.1. DOI: 10.33899/mjn.2020.164725.
16. Joyce ,Ch., . Ssenyonga, L., Iramiot, J.,(2020) Breast self-examination among female clients in a tertiary hospital in Eastern Uganda. International Journal of Africa Nursing Sciences. 12 (2020) 1001.
17. Khonji1,L., Rashwan,Z., Eweida,R., Narayanan,G., Darwish, E., and Bayoumi, M., (2024). Assessment of University Students' Knowledge, Attitude and Practice Regarding Breast SelfExamination in Bahrain. Open public health journal. DOI: 10.2174/0118749445300120240329082645, 2024, 17, e18749445300120.
18. Kaphle HP. (2023). Breast self-examination: Knowledge, practice and associated factors, Nepal. PLoS One. 2;18(6):e0286676. doi: 10.1371/journal.pone.0286676. PMID: 37267248; PMCID: PMC10237491.
19. Koc, G., Gulen-Savas, H., Ergol, S., Yildirim-Cetinkaya, M., Aydin, N., (2019). knowledge and practice of breast self-examination in Turkey. Niger J Clin Pract. 22(3):410–5. doi: 10.4103/njcp.njcp_341_18.
20. Meram, H., Bekmezci, E., Karakoç, H. *et al.* The relationship between nursing and midwifery undergraduate students' health beliefs and breast cancer knowledge levels and their breast self-examination behavior. J Public Health (Berl.) (2024). https://doi.org/10.1007/s10389-024-02221-2.
21. Mossa, K., (2022). Perceptions and knowledge of breast cancer and breast self-examination among young adult women in southwest Ethiopia: Application of the health belief model. Published online 2022 Sep 21. doi: 10.1371/journal.pone.0274935.
22. Mihret, M., Gudayu, T., Abebe, A., Tarekegn, E., Abebe, S., Abduselam, M., Shiferaw, T., Kebede, G., (2021). Knowledge and Practice on Breast Self-Examination and Associated Factors among Summer Class Social Science Undergraduate Female Students in the University of Gondar, Northwest Ethiopia. https://doi.org/10.1155/2021/8162047.

23. Maitanmi, J., Fadare,O., Kolawole,M., Aduroja ,M ., Faleti,D., Maitanmi, T., and Akingbade, O., (2023). Awareness and practice of breast self-examination among female staff at Babcock University, Nigeria. ecancer, 17:1615 https://doi.org/10.3332/ecancer.2023.1615.
24. Muhsin, M., & Yamin, L., (2022). Knowledge, Attitude, and Practice Regarding Breast SelfExamination Among Female Health Sciences Final Year Students. Malaysian Journal of Medicine and Health Sciences (eISSN 2636-9346) Mal J Med Health Sci 18(SUPP15): 205-212.
25. Nuhu, Kh., & Ngaski, G., (2020). Knowledge, Attitude and Practice of Breast Self-Examiniation among Female Undergraduate Students: A Cross-sectional Study.doi.or/10.29102/clinhp.200002. https://clinhealthpromot.org/index.php/clinhp/article/view/clinhp20002
26. Osman, H., Jothirajan, D., Conde, M., Thanganadar, CH., Rasheed, L., (2020). Breast Self-examination: Knowledge, Attitude and Practice among Female Nursing Undergraduate Students in the Northern Border University, KSA. JMSCR Journal. Volume 08 Issue 09 September 2020. https://dx.doi.org/10.18535/jmscr/v8i9.41.
27. Prakash, P., Khadka, Sh., Silwal, M., and Chandra, A., (2022). Assessment of knowledge on breast self-examination among female adolescent: a cross-sectional study. Clinical Journal of Obstetrics and Gynecology, 2022; 5: 036-041.
28. Rane MA (2019). Assess Knowledge and Practice of Regular Breast Self-examination among Female Employee of ITM Trust Member. Int J Nurs Med Invest.4(2):12-14.
29. Sadoh AE, Osime C, Nwaneri DU, Ogboghodo BC, Eregie CO, Oviawe O (2021). Improving knowledge about breast cancer and breast self examination in female Nigerian adolescents using peer education: a pre-post interventional study. BMC Women's Health 21(1).
30. Saudi Cancer Registry(2021). Cancer Incidence Report, Saudi Arabia. https://shc.gov.sa/Arabic/NCC/Activities/AnnualReports/2018.pdf.
31. Salloum, M., Ali, H., Ressen, O., (2024). Knowledge of Female Nursing Students regarding Breast Self-Examination in university of Karbala. Bahrain Medical Bulletin, Vol. 46, No. 1.
32. Sarker, R., Islam, MS., Moonajilin, MS., Rahman, M., Gesesew, HA., Ward, PR., (2022). Knowledge of breast cancer and breast self-examination practices and its barriers among university female students in Bangladesh: Findings from a cross-sectional study. PLoS One. 28;17(6):e0270417. doi: 10.1371/journal.pone.0270417. PMID: 35763525; PMCID: PMC9239455.
33. Sayed, S., & Ahmed, M., (2022). Perception Of Secondary-School Female Students on Breast Cancer and Breast Self-Examination in Merowe, Sudan. Journal of coastal life medicine |733–747.
34. Shahid, S., Anjum, Sh., Umbreen, G., Jabeen, Gh., (2024). Knowledge and Practice Regarding Breast Self-Examination (BSE) among Nursing Students Working in A Tertiary Care Hospital Lahore, Pakistan: An Observational Descriptive Cross Sectional Study. Journal of health and rehabilitation research DOI: https://doi.org/10.61919/jhrr.v4i2.809.
35. Siegel, R.L.; Miller, K.D.; Fuchs, H.E.; Jemal, A. Cancer statistics, 2022. CA: A Cancer Journal. Clin. 2022, 72, 7–33.
36. Sung, H., Ferlay, J., Siegel, RL., Laversanne, M., Soerjomataram, I., Jemal, A., (2021). Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA Cancer J Clin. 2021;71(3):209–49. doi: 10.3322/caac.21660.
37. WHO/B. Anderson. World Health Organization Breast Cancer. World Health Organization Breast Cancer 2023.
38. Workineh, M., Lak, E., Adella, D., (2021). Breast Self-Examination Practice and Associated Factors Among Women Attending Family Planning Service in Modjo. Breast Cancer: Targets and Therapy 2021:13 459–469.
39. Zahid I, Ahmed A, Ladiwala ZF, Sheikh R, Memon A. Breast self- examination awareness and practices in young women in developing countries: A survey of female students in Karachi, Pakistan. J Educ Health Promot 2018; 7(1): 90. http://dx.doi.org/10.4103/jehp.jehp_147_17 PMID: 30079361.