



Research article

Breast self-examination among female medical students at Damascus University: A cross-sectional study

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ABSTRACT

Introduction: Breast cancer (BC) is the leading cause of death in Syria. In young females, it is a serious complication, making it crucial to raise awareness about the disease and its early detection methods. Given the challenging circumstances that Syrians face, regular visits to medical centers for mammography are often not feasible. Therefore, breast self-examination (BSE) is a valuable tool for detecting cancer. Educating girls in medical colleges is key to disseminating knowledge about BSE among women, as they will become future healthcare providers and can share accurate information with their families.

Materials and methods: A cross-sectional study was conducted in the medical faculties of Damascus University (medicine, dentistry, and pharmacy), Syria. The study utilized a structured questionnaire on Google Forms with four sections. The questionnaire was prepared electronically, and shared as an online link in formal university groups on social media. Data collection started on September 19, 2022, and ended on October 19 of the same year. Participation was accepted from female students in medical colleges, ranging from second to fifth year (for dental and pharmacy students) and sixth year (for medical students). Data from other students and incomplete data were excluded.

Results: 589 female medical students from three faculties (medicine, dentistry, and pharmacy) filled out the questionnaire. Only 57 % of the students demonstrated a good attitude towards BSE, and 79.6 % of them agreed or strongly agreed that they avoid BSE due to fear of the consequences of breast cancer. Regarding BSE knowledge, 89.6 % of the participants reported previously hearing about BSE, and 55.7 % of them had performed BSE before. The factors that were accompanied by better knowledge about BSE were: a good attitude towards BSE; previously performed BSE; studying in a medical faculty; study years for medical and pharmacy students; and higher college average grades. Whereas, having a medical relative and having a family member with a history of BC surprisingly do not impact the knowledge.

Conclusion: The study, conducted at Damascus University in Syria, assessed the knowledge and practice of breast self-examination among female medical college students. The results indicate a moderate level of knowledge and limited practical experience in performing breast self-examination. These findings highlight the urgent need to emphasize the importance of promoting and teaching this method to a wider population of women in society.

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1. Introduction

Cancer was the second-leading cause of death in the United States in 2020 [1]. The most prevalent cancer in humans is breast cancer (BC), with 7.8 million cases in the past 5 years, making it the world's most prevalent cancer [2]. BC is less prevalent in developing countries compared with the Western world [3], but its incidence rate has been rising between 1990 and 2016 and is expected to continue rising without intervention for the next 10 years [4]. It affects women younger than those in the Western world, with a proportion as high as 20 % being diagnosed below the age of 40 [5,6]. In the Arab world, 11 out of every 100,000 deaths are BC-related [4]. In Syria, BC accounts for 21 % of new cancer cases and is the most lethal cancer as of 2020 [7].

Between 2010 and 2015, the corresponding 5-year breast cancer-specific survival rate for patients in women between 20 and 39 with localized breast cancer was 88.5 % and 56.5 % for metastatic breast cancer in the same age group [8]. Furthermore, the majority of existing data suggests that a diagnosis of breast cancer at a young age is associated with poor prognostic outcomes. Consequently, young patients are frequently recommended for aggressive multimodal treatments that may have detrimental effects on fertility [9]. Therefore, it is imperative to detect and treat BC early, as it significantly lowers death rates [10]. Screening methods for BC include regular mammography, Clinical Breast Examination (CBE), Breast Self-Examination (BSE), and others [11]. As of 2022, the CDC recommends women between the ages of 40 and 74 get a mammogram every two years [12]. However, there is no screening recommendation for women below the age of 40, even though BC in this age group shows more aggressiveness and resistance to treatment [13]. Regular mammography and CBE require a visit to a medical facility to undergo these tests, which may not always be possible for women in Syria due to the crisis, especially those who live in rural or developing areas of the country. Despite regular mammography representing the most efficient screening method [12], BSE may be the only available screening at times, even though it is not the best method [11,12]. Despite the importance of awareness and knowledge about BC, many studies found that awareness of BC in the Arab world is low [14,15], and the disease is being discovered at advanced stages [16,17].

Medical students' knowledge about breast cancer preventive measures is especially important because of their current role in spreading awareness among family and friends and their future role as healthcare providers. Many papers studied medical students' knowledge of BC and BSE [18,19], including a paper published in April 2020 that studied this subject in Syria but included only private university students [15].

This study aims to assess female medical faculties (medical, dentistry, and pharmacy) students' attitudes towards BSE, knowledge about it, practice of it, and the correlation between socio-demographic characteristics and family history with knowledge and attitude towards BSE at Damascus University, Syria.

2. Materials and methods

2.1. Participants and sampling

This cross-sectional study aimed to include female students from medical faculties (medicine, dentistry, and pharmacy) at Damascus University, Syria. The data were collected from 19 September until 19 October 2022.

The sample size was determined to be 368 using the formula of Krejcie & Morgan (1970):

$$n = \frac{X^2 NP(1 - P)}{D^2(N - 1) + X^2 P(1 - P)}$$

($X^2 = 3.841$) is the determined table value of chi-square. ($N = 8300$) is the population size based on the formal records of the university. ($P = 0.5$) is the assumed population proportion. ($D = 0.05$) is the degree of accuracy. However, by the end of the data collection period, the number of respondents was 621; we excluded 32 participants because they did not meet the participation criteria; and the final number of participants was 589.

2.2. Data collection

A representative sample of these students was questioned using a structured self-administered questionnaire designed on Google Forms and shared as an online link in formal university groups on social media (Telegram®, Facebook®, and Messenger®), which specifically target students encompassing the entire population of interest. Therefore, any student who clicks on the link can access and fill out the questionnaire. The inclusion criterion was females of medical faculties in their second to final year (sixth in medicine and fifth in dentistry and pharmacy), whereas the exclusion criteria were females of non-medical faculties and incorrect data, in addition to first-year females. The first year is united between medical faculties, so their responses would not be helpful in the comparison.

2.3. Questionnaire

The questionnaire consists of four sections. The first included sociodemographic characteristics. The second evaluated breast self-examination (BSE) knowledge. The third assessed attitudes toward BSE. And the fourth assessed skills of practicing BSE. The questions' style varied between multiple-choice questions for the first, second, and fourth sections, and a 5-point Likert scale (ranging from 1 = strongly agree to 5 = strongly disagree) for the third one.

The questionnaire was pre-validated and used in a similar previous study [20]. A pilot study on 40 female students was conducted

to review it and ensure its clarity. Cronbach's Alpha coefficient was measured to assess the reliability. In the second and fourth sections (BSE knowledge and practice), it showed an acceptable value of (0.801), and in the third one (attitudes toward BSE), it showed (0.771).

2.4. Ethical consideration

Our study complies with the Declaration of Helsinki for research involving human subjects. Ethical approval has been obtained from the Ethical Committee of Damascus University, Faculty of Medicine, Syria (September 8, 2022), and the ethical approval reference number was 6594. Participation was completely voluntary after the participants read the purpose of the study at the beginning of the questionnaire. Informed consent was obtained from the participants before they filled out the questionnaire. Data were gathered anonymously and no names were taken.

2.5. Statistical analysis

Data were described using frequency and percentage for categorical variables, besides mean and standard deviation for continuous

Table 1
Socio-demographic characteristics of the participating female students (n = 589).

Variable	Frequency (589)	Percentage (%)
Age		
18–20	132	22.4
21–23	388	65.9
24 or more	69	11.7
Place of residence		
Urban	409	69.4
Rural	180	30.6
Marital status		
Single	556	94.4
Married	33	5.6
Financial status		
Below average	31	5.3
Average	187	31.7
Good	340	57.7
Excellent	31	5.3
College		
Medicine	257	43.6
Dentistry	98	16.6
Pharmacy	234	39.7
Study years (Medicine)		
2nd	52	20.2
3rd	54	21.0
4th	77	30.0
5th	38	14.8
6th	36	14.0
Study years (Dentistry)		
2nd	31	31.6
3rd	21	21.4
4th	28	28.6
5th	18	18.4
Study years (Pharmacy)		
2nd	47	20.1
3rd	47	20.1
4th	81	34.6
5th	59	25.2
College average grade		
Less than 70 %	39	6.6
70%–80 %	286	48.6
80%–90 %	236	40.1
90 % or more	28	4.8
Medical relative		
Yes	378	64.2
No	211	35.8
Family history of BC		
Yes	148	25.1
No	441	74.9
Family member who had a history of BC (n = 148)		
Mother or sister	27	18.2
Grandmother or aunt	116	78.4
Other	5	3.4

variables. A scoring system was used for questions that evaluated students' BSE knowledge. The correct answer scored (1), while incorrect and "I don't know" scored (0) with a maximum score of 9. We calculated the median of attitude score and considered that what is above it represents a good attitude and what is below it represents a poor attitude. One-way analysis of variance (ANOVA) was conducted to analyze differences in mean knowledge scores based on college, financial status, college average grade, and mother's education, while independent samples *t*-test was used to analyze differences based on place of residence, medical relative, family history of breast cancer, attitude towards BSE, and previously performing BSE. Furthermore, the relationship between study years and BSE knowledge was analyzed using Spearman's rank correlation coefficient. Data were analyzed using IBM SPSS version 26.

3. Results results

3.1. Socio-demographic characteristics and family history

The study consisted of 589 female medical students from three faculties (medicine, dentistry, and pharmacy) (Table 1), with a response rate of 100 %. Among the participants, 22.4 % were aged between 18 and 20, while the majority (65.9 %) were aged between 21 and 23. The majority of the study group was unmarried (94.4 %), and 69.4 % were from urban areas. Financially, 57.7 % of students reported having a good financial status, and almost half of them (48.6 %) had an average college score of 70%–80 %. Additionally, 64.2 % of the students had a medical relative, and 25.1 % had a family history of BC, with 78.4 % of those cases being their grand-mother or aunt (Table 1).

3.2. Attitude towards breast self-examination

Regarding BSE attitude, 57 % of the participants demonstrated a good attitude towards BSE, as reflected by an average attitude score of 30.66 ± 4.15 (maximum score = 40). The majority of participants (96.2 %) agreed or strongly agreed on the importance of learning BSE, and 57.6 % agreed or strongly agreed that they fear or feel uncomfortable going to a physician for a checkup if they find a lump. 79.6 % agreed or strongly agreed that they avoid BSE due to fear of the consequences of breast cancer, and 70 % agreed or strongly agreed that they feel uncomfortable examining their breasts (Table 2).

3.3. Breast self-examination knowledge

Regarding BSE knowledge, Fig. 1 displays the percentage of participants with correct answers. Among the participants, 89.6 % reported previously hearing about BSE, and 55.7 % of the students had performed BSE before. The average score for BSE knowledge was 4.39 ± 2.57 (maximum score = 9). Notably, only 14.8 % of the students answered the least correctly answered question, which was "Which is NOT the correct method to evaluate nipple discharge", whereas the question that received the highest percentage of correct answers was "Where else do you look for a lump other than the examining breast", with 82.34 % of the students answering correctly (Fig. 1). The internet and social media were the primary sources of knowledge regarding BSE, accounting for 50.8 % of answers (Fig. 2).

3.4. Correlation between variables

The findings of the current study did not show any statistically significant correlation with having a medical relative ($T = 1.214$, p

Table 2
Attitudes toward BSE (n = 589).

Statement	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mean ^a ± SD
I feel it is important to learn BSE.	3 (0.5)	2 (0.3)	17 (2.9)	112 (19.0)	455 (77.2)	4.72 ± 0.58
I fear/feel uncomfortable going to a physician for a checkup if I find a lump.	41 (7.0)	107 (18.2)	102 (17.3)	242 (41.1)	97 (16.5)	3.42 ± 1.17
I avoid BSE for fear of consequences of breast cancer.	23 (3.9)	40 (6.8)	57 (9.7)	313 (53.1)	156 (26.5)	3.92 ± 0.99
I feel uncomfortable to examine my breasts.	23 (3.9)	66 (11.2)	88 (14.9)	299 (50.8)	113 (19.2)	3.70 ± 1.03
There are not enough awareness programs in our community to teach BSE.	6 (1.0)	62 (10.5)	116 (19.7)	225 (38.2)	180 (30.6)	3.87 ± 1.0
If you do a routine mammography, you do not need to perform BSE.	35 (5.9)	128 (21.7)	168 (28.5)	218 (37.0)	40 (6.8)	3.17 ± 1.03
If you have a breast examination performed by a healthcare worker, you do not need to perform BSE.	29 (4.9)	99 (16.8)	150 (25.5)	267 (45.3)	44 (7.5)	3.34 ± 1.0
I encourage BSE for my family and community members.	4 (0.7)	4 (0.7)	62 (10.5)	128 (21.7)	391 (66.4)	4.52 ± 0.76

^a Mean > 3: Positive average attitudes.

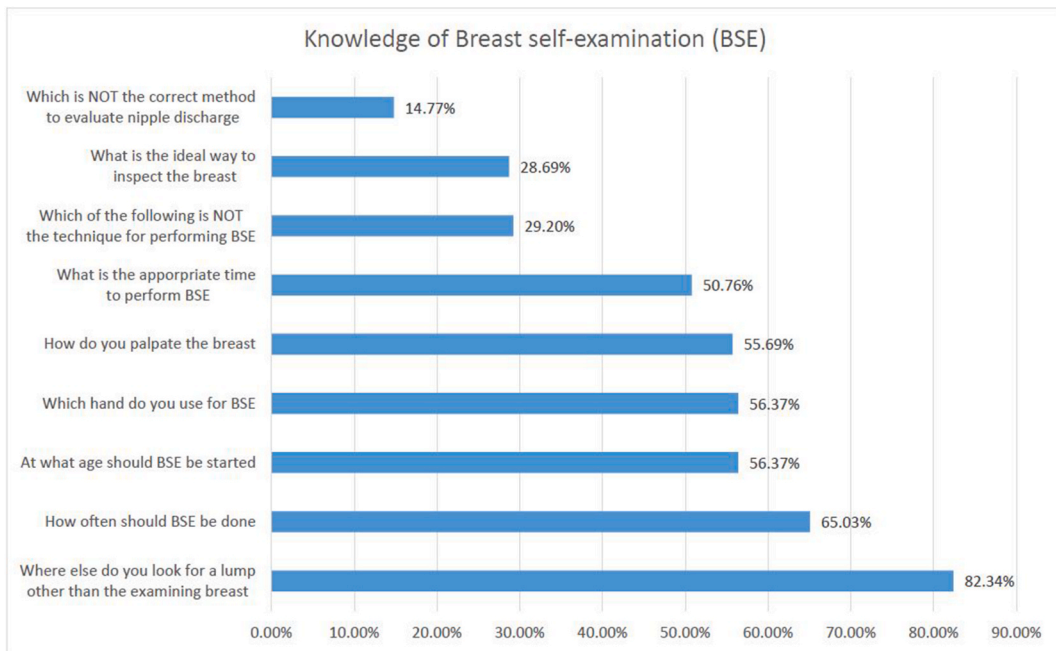


Fig. 1. Percentage of participants with right answers regarding breast self-examination.

= 0.23) or having a family member with a history of BC ($T = -1.667, p = 0.096$) (Table 3). Participants who had a good attitude towards BSE had a higher score (4.87 ± 2.45) compared to those with a poor attitude (3.76 ± 2.59) ($T = -5.136, p < 0.001$), and individuals who had previously performed BSE demonstrated a better BSE knowledge score (5.66 ± 1.91) compared to those who had not (2.79 ± 2.39) ($T = -15.818, p < 0.001$). Additionally, medical students (5.87 ± 2.16) achieved significantly higher scores compared to students of pharmacy (3.27 ± 2.3) and dentistry (3.2 ± 2.17) ($F = 101.037, p < 0.001$). Moreover, there was a significant effect of college average grade on BSE knowledge scores ($F = 12.506, p < 0.001$), with higher scores observed in participants with higher college average grades (Table 4).

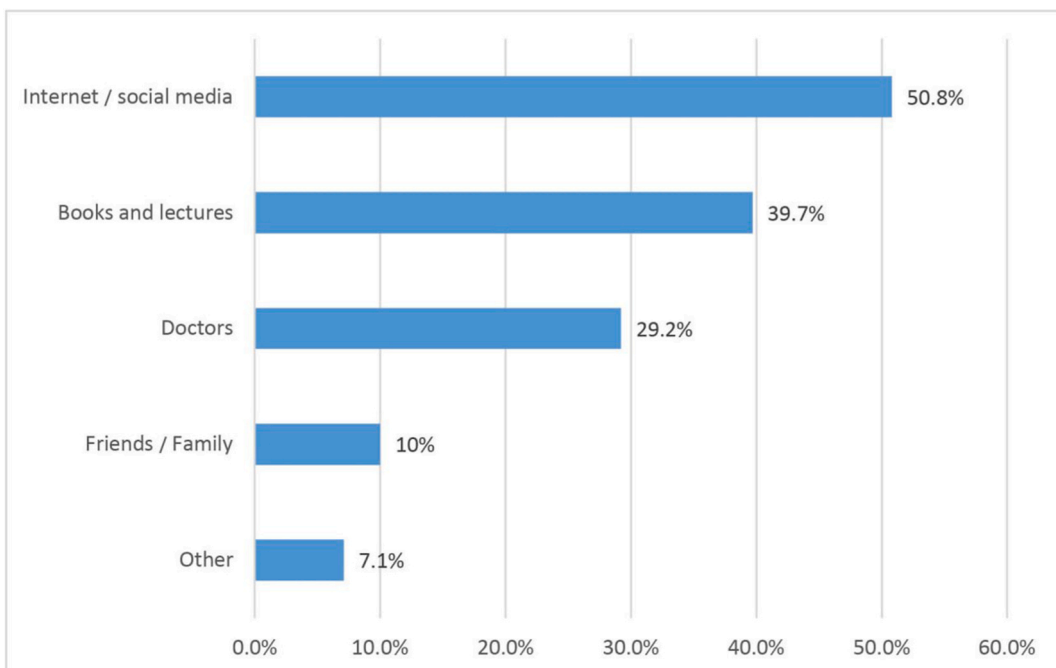


Fig. 2. Sources of information about breast self-examination.

With regards to the relationship between study years and BSE knowledge, there was a significant positive correlation observed using Spearman's rank correlation coefficient for the entire sample ($\rho = 0.327$, $p < 0.001$). Specifically, there was a positive correlation between study years and BSE knowledge for medical students ($\rho = 0.458$, $p < 0.001$) and pharmacy students ($\rho = 0.178$, $p = 0.006$), but not for dentistry students ($\rho = 0.21$, $p = 0.038$) (Fig. 3).

4. Discussion

The incidence rate of breast cancer has risen in the Arab world, with expectations of further increases in the next decade [4]. Raising awareness and spreading knowledge about early detection methods is crucial. Breast self-examination (BSE) is the most simple and cost-effective breast cancer screening method for resource-constrained countries like Syria. The present study aimed to assess BSE knowledge among female medical students at Damascus University and their attitudes toward it. As future healthcare providers, they must educate women in their communities about breast cancer and the importance of early detection methods. Recent data indicates that breast cancer patients exhibit inadequate knowledge regarding breast self-examination and its benefits for early disease detection [21]. This highlights a critical need for improvement in awareness and education efforts in this area.

The majority of participants (89.6 %) had heard of BSE and acknowledged its usefulness in the early detection of breast cancer. Despite the students' awareness of BSE, only 55.7 % had performed it before. This result is consistent with previous studies, which have also found poor practice of BSE. A previous study in Syria, as well as studies in Gaza and Iran, all reported low rates of BSE practice among medical-related field students and healthcare workers. For example, the previous Syrian study found that only 32.7 % of students applied for BSE, even though 84.5 % agreed on the necessity of BSE even without any symptoms [15]. Similarly, the Gaza study showed that only 31.4 % of students claimed to practice BSE regularly, despite 96.5 % having heard about BSE [18]. The Iran study among female healthcare workers also found a low proportion of respondents regularly conducting BSE [22].

A study in the UAE among medical and non-medical students also found low rates of BSE practice, with only 37.3 % having a correct understanding of what BSE is and most participants (72.3 %) indicating that they did not perform BSE [19].

Studies in Saudi Arabia, Nigeria, and Turkey did not mention the students' field of study. However, a Saudi study revealed that less than half of women at the University of Tabuk reported ever practicing BSE in the previous year, despite 82.8 % identifying the benefits of BSE [23]. The Nigerian study indicated that 63.6 % of participants had performed BSE before, and a higher proportion (55.3 %) had good knowledge of BSE [24]. The authors of the Turkey study reported that half of the students indicated that they did perform BSE, and only half obtained additional information about BSE [25]. A recent review also showed similar results, with low rates of self-examination practice among female medical college students [26].

These studies indicate that despite having moderate or good knowledge of BSE and the advantage of performing it, the practice of BSE seems unsatisfactory, although the studies were conducted in different periods and areas. Therefore, if this continues to be the scenario, then not much can be done to help reduce the morbidity rate of breast cancer.

Students of the faculty of medicine achieved significantly higher scores compared to other students, which is a reasonable finding. The previous Syrian study had the same finding [15]. The UAE study also reported that the medical campus had the highest percentage of students who had heard about BSE and performed it [19]. An explanation for this finding is the more in-depth discussions on diseases with medical students during lectures and clinical exposures compared to others.

When comparing the students' knowledge of BSE with their studying years, we found that the percentage of knowledge increased from the first to the last year of study in both medicine and pharmacy students, unlike the dentistry students. According to our investigation of the previous correlation, we suspect the reasons are as follows: In the fourth and fifth years, this may be attributable to the curricula closely related to cancer, such as oncology, pathology, and gynecology in medical school and toxicology and immunology in pharmacy school. While in the sixth year, the explanation for increasing knowledge could be due to the preparation for the Unified National Exam.

These findings are consistent with those of a previous study conducted in Syria, except for the increasing knowledge among the sixth-year students in medicine and fifth-year students in pharmacy [15]. Other studies have also reported similar findings. A study conducted in Bangladesh found that the number of years the participants had been studying had a significant association with their

Table 3
Independent samples *t*-test analysis of factors affecting BSE mean knowledge score.

	Descriptive analysis			T test			
	N	Mean	Std. Deviation	Mean difference	T test value	<i>p</i> -value	
Place of residence	Rural	180	4.32	2.65	-0.109	-0.474	0.64
	Urban	409	4.43	2.53			
Medical relative	No	211	4.56	2.70	0.268	1.214	0.23
	Yes	378	4.30	2.49			
Family history of BC	No	441	4.29	2.61	-0.406	-1.667	0.096
	Yes	148	4.70	2.41			
Attitude towards BSE	Poor	253	3.76	2.591	-1.110	-5.316	<0.001 ^a
	Good	336	4.87	2.445			
Have you ever done BSE before	No	261	2.79	2.388	-2.872	-15.818	<0.001 ^a
	Yes	328	5.66	1.909			

^a A *p*-value of <0.05 was used to determine the statistical significance.

Table 4
One-way ANOVA analysis of factors affecting BSE mean knowledge score.

		Descriptive analysis							One Way ANOVA Test	
		N	Mean	Std. Deviation	95 % Confidence Interval for Mean		Min	Max	F	p.value
					Lower Bound	Upper Bound				
College	Medicine	257	5.87	2.16	5.60	6.13	0	9	101.037	<0.001 ^a
	Dentistry	98	3.20	2.17	2.77	3.64	0	7		
	Pharmacy	234	3.27	2.3	2.97	3.56	0	9		
Financial status	Below average	31	5.58	2.38	4.71	6.45	0	9	2.607	0.051
	Average	187	4.44	2.55	4.08	4.81	0	9		
	Good	340	4.28	2.56	4.01	4.56	0	9		
	Excellent	31	4.10	2.77	3.08	5.11	0	8		
College average grade	<70 %	39	3.82	2.38	3.05	4.59	0	7	12.506	<0.001*
	70%–80 %	286	3.94	2.39	3.66	4.22	0	9		
	80%–90 %	236	4.79	2.66	4.45	5.13	0	9		
	>90 %	28	6.50	2.17	5.66	7.34	0	9		
Mother's education	No education	20	4.80	2.35	3.70	5.90	0	9	0.628	0.64
	Primary	31	4.19	2.85	3.15	5.24	0	9		
	Secondary	64	4.75	2.55	4.11	5.39	0	9		
	High school	111	4.21	2.51	3.74	4.68	0	9		
	University	363	4.38	2.58	4.11	4.65	0	9		

^a A p-value of <0.05 was used to determine the statistical significance.

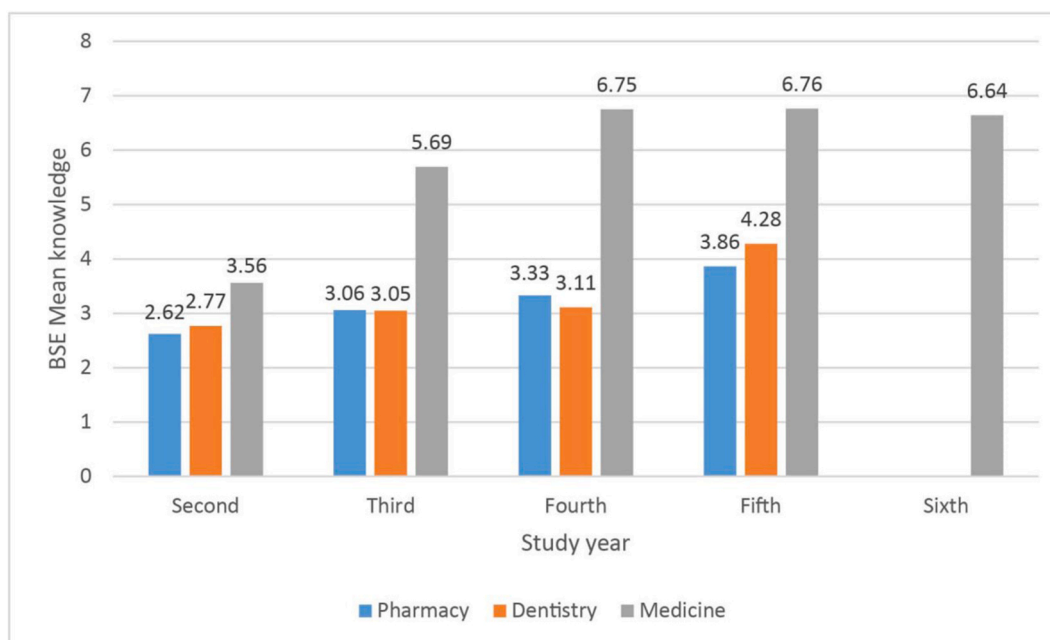


Fig. 3. Comparison of BSE knowledge scores across different years of study in medical, pharmacy, and dentistry faculties.

knowledge [27], and another study in Northwestern Nigeria reported a significant correlation between the regular performance of BSE and duration of stay at the university [28].

As indicated by the study, individuals who had previously performed BSE demonstrated better BSE knowledge. A previous study conducted in Bangladesh also showed the same finding [27], and a study in Gaza had a similar finding but with regular practice [18]. It is believed that performing BSE in itself will engrave knowledge of BSE on the mind, as it is not adequate to only receive knowledge.

The main reason for not performing BSE given by participants in our study was “fear of the consequences of breast cancer,” which aligns with the findings of the previous Syrian study [15].

Other studies among medical and non-medical field students in various countries reported different reasons for not performing BSE, such as not having a breast problem, having healthy breasts, not knowing or being ignorant of how BSE should be done, forgetting, being busy, and considering it unnecessary [18,19,25,27,29,30].

Some researchers found that Arab culture affects the performance of BSE; shyness and embarrassment during the examination of or talking about the private areas of women's bodies, like a breast, were identified as barriers that influenced BSE [23].

Therefore, we found various obstacles that stand in the way of women performing BSE. The field of study inevitably affects these obstacles, but other reasons also affect them. The evidence for this is that medical students in Syria chose fear as the main reason, while medical students in the Emirates chose "not knowing how" as the main reason [19]. Accordingly, we believe that there are other factors affecting female medical college students in Syria in particular. One of these factors might be psychological distress. A previous study conducted in Syria among medical students revealed high levels of psychological distress (depression, stress, and anxiety) that affect students' lives. The study also found that females were approximately two times more likely to be depressed and anxious than males, which could explain their chosen reason [31].

We reported that there is a significant effect of college average grades on BSE knowledge scores, which is reasonable, as people who spend more time and put more effort into studying will be knowledgeable about topics regarding women's health that are included in their university syllabus, such as BSE.

We found that the majority of participants (89.6 %) were aware of BSE, with the internet and social media being the most common sources of information. This finding is consistent with a previous study conducted in Malaysia [32] and the UAE [19]. Given that the age group that uses social media is predominantly young people (Gen Z), this highlights one of the positive effects of social media in disseminating important information to individuals of all ages, particularly youth.

In contrast, a study in Nigeria found that health workers were the most common source of information [24], while in Gaza, university studies were the primary source of information [18]. These findings underscore the valuable role of health workers and the significance of university curricula in educating individuals about BSE.

Our study did not find any statistical significance regarding family members with a history of BC.

However, studies conducted in Gaza, Nigeria, and Bangladesh reported that a family history encouraged practicing BSE [18,24,27]. Another study among informal caregivers of breast cancer patients found that while they knew BC prevention practices, including BSE, they did not perform them [33]. Additionally, a study conducted in Ethiopia showed that knowing someone who had BC was significantly associated with knowledge of BSE [34].

These findings are not in line with our study. We suspect that there might be two main factors behind this finding. The first factor, as mentioned previously, is that the majority of female medical students avoid performing BSE out of fear of the results, indicating their true fear of BC. Furthermore, their fear of BC may be more severe than that of other female students, as they are studying in medical fields and properly understand what cancer is and its stages. This fear has negatively affected the behavior of these females, leading them to avoid information sources to avoid increasing their fear. The other factor is the effect of psychological illnesses on BC patients. As we know, the presence of a patient in a family routinely makes the entire family concerned about her disease. This patient plays the greatest role in educating and informing them. According to the latest research conducted in Syria [35], it appears that one-third of women with BC are more likely to suffer from anxiety and depression. Psychological illnesses may prevent them from spreading awareness and knowledge about BC and BSE among their close circle of people.

In addition, the findings of the current study do not show any statistical significance regarding having a medical relative, which is consistent with the previous Syrian study [15]. This is dispiriting, as much of the responsibility lies with the medical relative in educating the females about BC and BSE.

The current study shows that 50.76 % of participants knew the appropriate time to perform BSE. Compared to other studies, the number of participants with the right answer is adequate. Many studies conducted among students studying medical-related fields had similar findings. The majority (69.8 %) of respondents in the Gaza study knew the time to conduct BSE [18], and 42.8 % of Sharjah study participants answered this question correctly, while "anytime" was the chosen answer of 33.7 % of the students [19].

Comparatively, other studies' findings were dispiriting. In the Nigeria study, 63.3 % of the participants believed that BSE should not be performed after menopause [24]. Furthermore, the Ethiopia study reported that almost two-thirds of the participants didn't know the right time to perform BSE [34]. Likewise, a Turkey study reported that only 24.6 % answered this question correctly [25], and nearly half of the participants in the Angola study were not aware of the best time in their menstrual cycle to perform BSE [36].

As a result, it is not only crucial to conduct BSE but also crucial to understand the appropriate time to conduct it to achieve the desired benefit from this early detection method.

In conclusion, our study provides insight into the knowledge and awareness of breast self-examination (BSE) among females in our academic institutions. We believe that the primary benefit of our results is the encouragement of all females in our faculties to learn about when and how to practice breast self-examination (BSE) [37,38].

5. Limitations

Data collection relied on the honesty of the participants in filling out the self-questionnaires, and the randomization principle could not be achieved due to convenience sampling as the questionnaire was distributed on social media, which may lead to information bias. Additionally, there was an inability to deliver the questionnaire to large numbers of female dental students because they were busy dealing with patients in college clinics most of the time. Moreover, the study was conducted in the medical faculties of Damascus University only, and there are no similar studies in other governorates to compare our results with.

6. Recommendations

Based on our results, several steps should be taken to increase awareness about breast self-examination among medical students and

the general population. These steps include emphasizing the importance of breast self-examination and regular practice during scientific lectures and seminars, promoting clearer and more comprehensive information on breast self-examination in public health education lectures at medical colleges, encouraging students' relatives in the medical sector to play a more active role in spreading knowledge about breast self-examination among females in their communities, and providing information about self-examination and psychological support to female relatives of breast cancer patients, particularly those who are health care providers.

7. Conclusion

Our results show that the students' knowledge is generally average, but there is a lack of practical exercise. More than half of the participants have a good attitude towards breast self-examination, indicating that awareness could have a significantly positive impact on their knowledge. The role of students' medical relatives and the physician who diagnosed cancer in a relative was weak in advising breast self-examination as a useful prevention method in this age group, so we encourage future researchers to explore accurate reasons for the weak role of relatives working in the medical field. These findings call for action on several levels (college, physician's clinic, and family) to raise awareness of the examination and improve the general health of the population.

Ethics approval

Our study complies with the Declaration of Helsinki for research involving human subjects. Ethical approval has been obtained from the Ethical Committee of Damascus University, Faculty of Medicine, Syria (September 8, 2022), and the ethical approval reference number was 6594. Participation was completely voluntary after the participants read the purpose of the study at the beginning of the questionnaire. Informed consent was provided on the first page of this questionnaire. If the participant agreed to enter the study, they would choose "Yes, I agree to participate" after reading the explanation provided on the first page of the questionnaire, then proceed to other sections: socio-demographic information and assessments of knowledge about self-examination and attitudes towards it and practice (the attached questionnaire can be reviewed to confirm the study explanation for participants), and if they do not agree, they would choose "No, I do not agree to participate" and automatically move to the end of the questionnaire without providing any information. Data were gathered anonymously, and no names were taken.

Consent for publication

Not applicable.

Availability of data and materials

Data will be made available on request.

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CRedit authorship contribution statement

Mohammed Alshafie: Writing – review & editing, Writing – original draft, Validation, Resources, Project administration, Methodology, Investigation, Data curation. **Anas Bitar:** Writing – original draft, Validation, Software, Formal analysis, Methodology, Data curation. **Massa Alfawal:** Writing – original draft, Data curation. **Mhd Basheer Alameer:** Writing – original draft, Data curation. **Dima Alhoms:** Writing – original draft, Data curation. **Maher Saifo:** Writing – review & editing, Project administration, Supervision.

Declaration of competing interest

The authors declare that they have no competing interests.

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Abbreviations

BSE	Breast Self-Examination
CBE	Clinical Breast Examination
BC	Breast Cancer

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