

Original Article

Knowledge, Attitude and Practice of Breast Self-Examination and Breast Cancer Risk Factors among Female Medical Students at the University of Benghazi

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Abstract

Breast cancer (BC) is the most common malignancy among women globally and a leading cause of cancer-related mortality in Libya, where late-stage diagnosis remains prevalent. Breast self-examination (BSE) is a low-cost, accessible screening tool particularly valuable in resource-limited settings. This study assessed the knowledge, attitudes, and practices (KAP) of BSE, as well as awareness of BC symptoms, risk factors, and protective factors among female medical students at the University of Benghazi. A descriptive cross-sectional survey was conducted among 422 undergraduate female medical students during the academic year 2023. Data were collected using a pre-coded self-administered questionnaire based on validated tools. Knowledge of BSE was assessed on a 9-item scale and was categorized as adequate ($\geq 75\%$), moderate (50-74%), and poor ($< 50\%$). Attitudes and practices were assessed through direct questions. The associations between sociodemographic variables and outcomes were analyzed using chi-square tests. The mean age was 24.5 ± 3.1 years. Only 26.1% of participants had adequate knowledge of BSE, 49.1% had moderate knowledge, and 24.9% had poor knowledge. Most of the participants (80.5%) had a positive attitude towards BSE, but only 18.2% reported doing BSE regularly (monthly). Regular practice was significantly associated with older age ($\chi^2(3) = 21.87$, $p < 0.001$), clinical academic year ($\chi^2(1) = 18.77$, $p < 0.001$), and marital status ($\chi^2(1) = 6.05$, $p = 0.014$), but not with family history of BC ($p = 0.245$). BC symptoms and known risk factors were generally well known, while some protective and risk factors were misperceived. Conclusion: Although attitudes are positive and awareness is moderate, female medical students in Benghazi have poor knowledge and practice of BSE. We recommend that structured and practical BSE training be incorporated into the pre-clinical medical curriculum to bridge the knowledge-practice gap and train future physicians to be advocates of early detection.

Keywords. Breast Self-examination, Knowledge, Attitudes, Practices, Medical Students, Libya.

Introduction

Cancer is a leading health problem worldwide, with 19.3 million new cases and 10.0 million deaths in 2020. Breast cancer (BC) is one of the most common malignancies in women and is still a leading cause of cancer-related death in the world. According to GLOBOCAN 2022 estimates from the International Agency for Research on Cancer (IARC), there are 2,296,840 new female breast cancer cases and around 666,103 deaths in women [1]. BC represents 11 in every 100,000 deaths in the Arab world [2]. Considering the rates of cancer in Libya, breast cancer has become a major concern for the population. Breast, colorectal and cervical cancer are the most common types of cancer among females in Libya, accounting for 28.5%, 12.7%, and 6.8%, respectively [1]. Trends in breast cancer statistics are upward, influenced by factors such as unhealthy lifestyles like smoking, lack of physical activity, eating high-calorie foods, and changes in childbearing and breastfeeding patterns [3].

Developing countries, especially in Asia and Africa, have seen an increased prevalence of breast cancer in the past few decades. The author of the systematic review and meta-analysis study that included one study from Libya stated that breast cancer is still the most common cancer in women in Africa. Inadequate screening programmes, low awareness, and low education levels all contribute to late diagnosis and worse outcomes [4]. Local studies by Libyan researchers have confirmed that the majority of breast cancer patients in Libya are diagnosed at advanced stages of the disease, often with lymph node involvement or distant metastasis at the time of diagnosis [5,6]. The two main strategies for early detection of breast cancer are screening and early diagnosis. Rapid detection is vital for improving the prognosis and outcomes of patients with breast cancer [7].

Most of the data currently available indicates that a breast cancer diagnosis at a young age is linked to a poor prognosis. As a result, aggressive multimodal therapy that may negatively impact fertility is frequently recommended for young patients [8]. Hence, early detection and treatment of BC are very important to significantly decrease the rates of death.

BC screening is performed by means of breast self-examination (BSE), clinical breast examination (CBE), routine mammography, and other techniques [9]. The CDC encourages women aged 40 to 74 to undergo a mammogram every two years. Despite the fact that BC in women under 40 shows greater aggression and treatment resistance, screening is not advised for this age group [10]. In this context, BSE has emerged as a useful tool to help women take charge of their breast health. The cost-effectiveness, ease of use, and no need for any specialized tools or frequent hospital visits of BSE

demonstrate its value in resource limited settings [11], especially in resource limited countries where the lack of knowledge about screening and diagnostic methods worsens the mortality rates [12].

BSE is one of the most common early detection tools for breast cancer, and it allows patients to evaluate their breast tissue for any physical or visual changes. It is recommended that people of both genders do BSE monthly to find out any changes in breast tissue starting at eighteen years of age [13]. Although some health organizations no longer recommend BSE as a stand-alone screening tool, mainly due to the lack of evidence that it significantly reduces mortality, it still has value as a method for women to notice any unusual changes in their breasts early [14,15]. Despite its importance, BSE awareness and practice among young women, especially medical students, are often below the required levels.

This may indicate that women in Libya are often unable to access medical facilities for routine mammography and clinical breast examinations, particularly for women living in rural or underdeveloped parts of the country. Although routine mammography is the most effective screening approach, BSE may be the only screening option available, albeit with low efficacy [9]. Despite the importance of breast cancer knowledge and understanding, various studies have reported low levels of breast cancer awareness in the Arab world [16,17]. The Knowledge, Attitude, and Practice (KAP) survey provides a diagnostic research tool for assessing a group's knowledge, attitude, and practice on a specific topic, particularly in the context of health education. Medical students need to be well aware of the methods of breast cancer prevention, as they are now responsible for spreading awareness amongst their family and friends and will be future medical practitioners. Their Knowledge, Attitudes, and Practices (KAP) significantly affect the commencement and successful completion of breast cancer screening. Thus, it is necessary to evaluate the knowledge of medical students about breast cancer screening to assess the effectiveness of medical education and to find out the need for more content on cancer screening in future educational programs. Also, their attitudes and practices can help us understand their perspectives and practices about breast cancer screening, which is important for future medical practice and patient care. Future careers of medical students with positive and proactive attitudes towards cancer screening are likely to be more active in promoting early cancer detection and screening. Much research has been performed to assess knowledge, attitudes and practices regarding BSE in different demographics, but there is a big lack of data among female medical students, especially in Libya.

Therefore, this study aimed to explore the knowledge, attitudes, and practices surrounding BSE and Breast Cancer Risk Factors among Female Medical Students at the University of Benghazi.

Methods

The Study design, setting, and period

A descriptive cross-sectional study was conducted among female medical students at the Faculty of Medicine, University of Benghazi, Libya.

Study population and eligibility criteria

The study population consisted of undergraduate female medical students studying at the medical faculty of Benghazi University, Libya, attending classes during the academic year. The inclusion criteria were female undergraduate medical students in pre-clinical years (first to third) and clinical years (fourth to fifth), who were present during data collection and willing to participate. The exclusion criteria were students who were not interested in participating, provided incorrect data, or had a known diagnosis of breast cancer or a history of breast surgery.

Sample size and Sampling Technique

We calculated sample size using the Raosoft online sample size calculator. The minimum sample was calculated using the single population proportion formula assuming 95% confidence, 5% margin of error, and an expected proportion of adequate BSE knowledge of 59.5%. This yielded a minimum sample of 371 participants. To account for an anticipated non-response rate of 10%, the target sample size was increased to 412.

Among 4320 female medical students enrolled at Benghazi University in 2023, we recruited 422 participants (102% of target), achieving $\pm 4.7\%$ precision with $>95\%$ power for primary and secondary outcomes.

Validity and Reliability

The preliminary questionnaire was pilot tested among a group of female medical students with sociodemographic characteristics similar to the target 20. The pilot aimed to assess clarity, comprehensibility, and the average time required to complete the survey. Feedback from participants was used to refine wording, adjust ambiguous items, and improve the overall flow of the questionnaire.

Data collection

A representative sample of these students was questioned using a pre-coded structured self-administered questionnaire designed on Google Forms and paper handouts.

Survey questionnaire development

The questionnaire was adapted from a previously validated questionnaire published, with alterations to adapt to the local setting. The questionnaire was developed in English and translated into Arabic and back-translated into English for consistency checks. The original version was pilot-tested amongst 10 participants from a similar socio-economic background in Benghazi, and the results were used to refine the wording of subsequent versions to promote better understanding. The findings from this pilot study proved to provide important initial insights and helped to make necessary refinements, such as rewording of statements within the tool. This translated version was then revised and translated back to English by an experienced colleague to ensure translation accuracy.

The questionnaire is composed of 5 sections.

Socio demographic

The first section is designed to gather information about participants' socio-demographic characteristics (age, marital status, academic year, and family history of breast cancer).

Knowledge of breast self-examination (BSE)

The second section was designed to assess Knowledge about Breast Self-Examination (BSE) by using a validated 9-item questionnaire adapted from prior multi-country studies among female university students.

The scoring system categorized knowledge levels into three groups: adequate knowledge (above 75%), moderate knowledge (50% to 75%), and poor knowledge (below 50%). Each item was scored dichotomously (1 = correct response, 0 = incorrect/don't know), yielding a maximum BSE knowledge score of 9 points (higher scores indicating greater knowledge). Correct responses were pre-defined based on international breast cancer screening guidelines. Composite scoring enabled categorization of BSE knowledge levels and identification of specific knowledge gaps.

This evaluation aimed to highlight areas for improvement in education and awareness about breast health among future healthcare professionals.

Knowledge Level Classification (based on 0–9 score):

- Adequate knowledge: 7–9 ($\geq 75\%$)
- Moderate knowledge: 5–6 (50%–74%)
- Poor knowledge: 0–4 ($< 50\%$)

Attitudes toward breast self-examination

The third section assessed attitudes toward BSE; categorical responses (very important, important and not important) were employed. Participants who rated BSE as very important and important were categorized as having a positive attitude toward BSE.

Practice of breast self-examination

BSE practice was assessed using a direct question: "Do you perform breast self-examination regularly?" with response options "Yes" or "No." For this study, "regularly" was defined as performing BSE.

Awareness of breast cancer symptoms, risk factors, and protective factors

This section evaluated recognition of common breast cancer symptoms (e.g. breast lump, skin changes, nipple discharge), lifestyle-related protective factors (e.g. breastfeeding, regular exercise, low-fat diet), and established or perceived risk factors (e.g. family history, hormonal therapy, obesity, smoking, exposure to chest X-rays). Participants indicated "yes" or "no" for each item; frequencies and percentages were reported to describe the level of awareness in the study population.

Statistical analysis

Data were analyzed using SPSS version 26 (IBM Corp., Armonk, NY, USA). Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize sociodemographic characteristics and KAP outcomes. Chi-square tests of independence examined associations between sociodemographic variables (age group, academic year, marital status, family history of BC) and outcomes (BSE attitude and regular practice). Statistical significance was set at $p < 0.05$. Odds ratios (OR) and 95% confidence intervals (CI) are reported for significant associations.

Results

Socio-demographic characteristics and family history

The study consisted of 422 female medical students who completed self-administered and web-based questionnaires were included in the analysis. Regarding the socio-demographic profile, the mean age was 24.5 ± 3.1 years. Almost half of the participants (49.5%) were in the 21-25 age group, and more than one-third of them (37.4%) were in the 26-30 age group. In total, 422 students participated. Regarding marital status, most participants were single (386, 91.5%), and 36 (8.5%) were married.

With respect to academic level, the majority of respondents 61.4% were categorized within clinical years, which entail direct patient care, including fields such as surgery, internal medicine, and imaging. The remaining participants (38.6%)

were identified as being in pre-Clinical years, which include disciplines such as basic medical sciences, public health, and pharmacology.

A family history of breast cancer was reported by 69 participants (16.4%), whereas 353 (83.6%) reported no family history.

Table 1. Sociodemographic characteristics (N = 422)

Characteristics	N (%)
Age	
18-20	48 (11.4)
21-25	209 (49.5)
26-30	158 (37.4)
≥30	7 (1.7)
Mean±SD (years)	24.5±3.1
Academic Year	
Pre-Clinical	163 (38.6)
First year	46 (10.9)
Second year	72 (17.1)
Third year	45 (10.7)
Clinical	259 (61.4)
Fourth year	99 (23.5)
Fifth year	102 (24.2)
Intern year	58 (13.7)
Family history of breast cancer	
Positive	69 (16.4)
Negative	353 (83.6)
Marital Status	
Single	386 (91.5)
Married	36 (8.5)

Knowledge related to BSE and sources of information about BSE.

Regarding BSE knowledge, the average score for BSE knowledge was 5.52±1.45 (range 0–9). Based on the predefined scoring categories, notably, only 26.1% of participants had adequate knowledge about BSE (score 7–9), and approximately half (49.1%) of participants had moderate knowledge (score 5–6), while almost one-quarter (24.9%) of them had poor knowledge about BSE (score 0–4) (Table 2).

Table 2. Levels of BSE knowledge (N = 422)

Knowledge Level	Score	N (%)
Poor Knowledge	(0–4)	105 (24.9%)
Moderate Knowledge	(5–6)	207 (49.1%)
Adequate Knowledge	(7–9)	110 (26.1%)

The primary sources of information reported by participants were the internet/social media (53.3%) and attendance at audits or presentations (34.9%). Fewer participants cited medical school as a source (11.5%), while a minority reported obtaining knowledge from television stations (9.8%), family members (9.5%), or friends (6.1%) (Table 3).

Table 3. Source of information about BSE (N = 422)

Source of Knowledge	Responses	Percent of Cases
Internet	185	53.3%
Audit/Presentation	121	34.9%
TV	34	9.8%
Medical School	40	11.5%
Family Members	33	9.5%
Friends	21	6.1%

Awareness of breast cancer symptoms

Recognition of key breast cancer symptoms was generally high. The most frequently recognized symptom was a lump in the axilla (92.1%), followed by differences in breast size (83.1%), breast skin changes (81.1%), and bloody nipple discharge (73.0%). The least recognized symptoms were any nipple discharge (57.3%) and perimenstrual breast pain (53.9%) (Table 4).

Table 4. Awareness of breast cancer symptoms (N = 422)

Breast cancer feature	n (%)
Lump in the axilla	389 (92.1%)
Differences in breast size	351 (83.1%)
Breast skin changes	342 (81.1%)
Bloody nipple discharge	308 (73.0%)
Any nipple discharge	242 (57.3%)
Perimenstrual breast pain	227 (53.9%)

Awareness of protective factors

Most participants identified several lifestyle-related protective factors against breast cancer, with the highest proportions recognizing breastfeeding (87.8%), low-fat food (83.3%), leafy green vegetables (81.8%), and regular exercise (80.9%). However, fewer participants considered vegetable oils (41.4%) and, notably, only 7.9% late marriage as protective factors (Table 5).

Table 5. Perceived protective factors against breast cancer

Protective Factor	Responses	Percent of Cases
Breastfeeding	367	87.8%
Leafy green vegetables	342	81.8%
Low-fat food	348	83.3%
Vegetable oils	173	41.4%
Regular exercise	338	80.9%
Late marriage	33	7.9%

Awareness of the breast cancer risk factors

Of the risk factors, most participants correctly identified several established and perceived risk factors for breast cancer. A family history of breast cancer was the most recognized (89.4%), exposure to chest X-rays was the second-best recognized risk factor, and use of replacement hormones (85.4%). Other commonly recognized risk factors included use of oral contraceptive pills (76.5%), obesity (66.9%), exclusive formula feeding (68.3%), smoking (70.0%), and eating high-fat meals (60.9%), whereas fewer participants identified exposure to pesticides (43.2%) as a risk factor (Table 6).

Table 6. Perceived risk factors for breast cancer

Risk Factors	N	%
The use of oral contraceptive pills	319	76.5%
Smoking	292	70.0%
Use of contraceptive devices	207	49.6%
A family history of breast cancer	373	89.4%
Obesity	279	66.9%
Exclusive formula feeding	285	68.3%
Having no children	261	62.6%
Early puberty	241	57.8%
Being exposed to chest X-rays	367	88.0%
The use of replacement hormones	356	85.4%
Living under high-voltage power lines	256	61.4%
Eating high-fat meals	254	60.9%
Exposure to pesticides	180	43.2%
Lack of physical exercise	219	52.5%
Late menopause	257	61.6%

Attitudes to breast self-examination

Overall, attitudes toward BSE were favorable. 80.5% of the participants demonstrated a good attitude towards BSE. Across age groups, the proportion of participants rating BSE as very important ranged from 64.6% among those aged 18–20 years to 85.6% among those aged 26–30 years, with no significant difference by age ($p = 0.059$).

Similarly, 76.7% of preclinical and 83.3% of clinical year students regarded BSE as very important, with no significant difference by academic year ($p = 0.282$). Among those with a positive family history of breast cancer, 77.9% rated BSE as very important, compared with 81.3% of those without a family history ($p = 0.432$). Notably, for marital status, 80.1% of single and 83.3% of married women considered BSE very important, again with no significant association ($p = 0.776$) (Table 7).

Table 7. Attitudes toward BSE by sociodemographic characteristics

Characteristic	Very important, n (%)	Important, n (%)	Not important, n (%)	p-value
Age (years)				0.059
18-20	31 (64.6)	16 (33.3)	1 (2.1)	
21-25	168 (80.0)	40 (19.0)	1 (0.5)	
26-30	136 (85.6)	22 (13.8)	0 (0.0)	
≥30	5 (71.4)	2 (28.6)	0 (0.0)	
Academic year				0.282
Pre-clinical	125 (76.7)	37 (22.7)	1 (0.6)	
Clinical	215 (83.3)	43 (16.7)	1 (0.4)	
Family history of breast cancer				0.432
Positive	53 (77.9)	15 (22.1)	1 (1.5)	
Negative	287 (81.3)	65 (18.4)	1 (0.3)	
Marital status				0.776
Single	310 (80.1)	74 (19.1)	2 (0.5)	
Married	30 (83.3)	6 (16.7)	0 (0.0)	

Practice of breast self-examination

Despite moderate knowledge and predominantly positive attitudes, regular practice of BSE was relatively low overall, with only a minority of participants reporting that they perform it monthly. Only 18.2% of participants regularly perform BSE.

Among age groups, the proportion of regular BSE practice increased with age ($\chi^2(3) = 21.87$, $p < 0.001$), ranging from 2.1% among those aged 18-20 years, 14.4% among those aged 21-25 years, 27.2% among those aged 26-30 years, and 42.9% among those aged ≥30 years (Table 8).

With regard to the relationship between study years and BSE practice, clinical-year students practiced BSE significantly more often than pre-clinical students (24.7% vs. 8.0%; $\chi^2(1) = 18.77$, $p < 0.001$; OR = 3.78, 95% CI: 1.99-7.19). Among the 77 students who practiced BSE regularly, 6.5% were in the first year, 5.6% in the second year, 19% in the third year, 27.5% in the fifth year, and 41.4% were interns.

Table 8. BSE practice by age and academic year (N = 422)

Characteristic	Practice BSE regularly			Test of significance
	Yes	No	Total	
	n (%)	n (%)	n (%)	
Age (years)				
18-20	1 (2.1)	47 (97.9)	48 (11.4)	$\chi^2(3, N = 422)$, $p = 0.001$
21-25	30 (14.4)	179 (85.6)	209 (49.5)	
26-30	43 (27.2)	115 (72.8)	158 (37.4)	
≥30	3 (42.9)	4 (57.1)	7 (1.7)	
Academic year				
Pre-clinical	13 (8.0)	150 (92.0)	163 (38.6)	$\chi^2(1, N = 422)$, $p = 0.001$
Clinical	64 (24.7)	195 (75.3)	259 (61.4)	

Marital status was significantly associated with BSE practice ($\chi^2(1) = 6.05$, $p = 0.014$); married students reported higher regular practice than single students (27.8% vs. 17.4%). No significant association was found between BSE practice and family history of BC (23.2% vs. 17.3%; $\chi^2(1) = 1.35$, $p = 0.245$) (Table 9).

Table 9. BSE practice by marital status and family history (N = 422)

Marital status	Perform BSE regularly		Total	Test of significance
	Yes	No		
	n (%)	n (%)	n (%)	
Single	67 (17.4)	319 (82.6)	386 (91.5)	$\chi^2(1) = 6.05$, $p = 0.014$
Married	10 (27.8)	26 (72.2)	36 (8.5)	
Family history of breast cancer				
Positive	16 (23.2)	53 (76.8)	69 (16.4)	$\chi^2(1) = 1.35$, $p = 0.245$
Negative	61 (17.3)	292 (82.7)	353 (83.6)	

Discussion

The study assessed knowledge, attitudes, and practices related to breast self-examination (BSE), as well as awareness of

breast cancer symptoms, risk, and protective factors among female medical students at the University of Benghazi, Libya. The emphasis on medical students is important because their participation in medical education may have an important impact on public health outcomes. This study is of particular importance because the incidence of breast cancer is said to be increasing in the Middle East, often diagnosed at more advanced stages of the disease than in Western countries. Overall, participants demonstrated moderate knowledge and largely positive attitudes toward BSE, but actual practice was low. These findings highlight important gaps in breast health education among future healthcare providers in a resource-limited setting where access to mammography and clinical breast examination may be constrained. The majority of study participants were young adults, with 49.5% aged 21 to 25, and 11.4% under the age of 20. This finding is in line with most of the previous studies, which mainly focused on breast cancer awareness in younger populations. For instance, they discovered that young women (18-29) are less likely to complete breast cancer screening methods such as BSE, as the minimum risk at this age group is low [15].

The knowledge toward BSE among female medical students

Regarding BSE among the current study population, the study findings indicate that the average knowledge score was moderate, with only 26.1% of students who achieving what the study defined as adequate knowledge. In line with our findings, several studies showed a range of knowledge levels regarding BSE from low to moderate levels among university or medical students. In Saudi Arabia, Albeshan et al. reported that only 4.2% of female university students had high BSE knowledge. Awareness was only 26.5% of people followed the guideline recommended frequency of self-examination, which is once a month. Remarkably, Students studying in health sciences had a significantly better BSE knowledge score [15]. Likewise, a study in Sudan explored the knowledge and practice of Sudanese final-year medical students regarding BSE. Although a significant majority of the participants had heard about BSE, the study reveals that their actual technical knowledge and frequency of practice were unexpectedly poor for individuals nearing the end of their medical training [18]. In the same stream study in Jordan found that 1.6 % of undergraduate students including Students in health sciences, had moderate level of knowledge regarding BSE. Health sciences Students scored significantly higher than those in the arts or general sciences [19]. In addition, it has been reported in several studies in other countries that health students had a higher level of adequate knowledge and performance of BSE [15,20]. Conversely, several studies assessing the knowledge of medical students regarding BSE showed adequate knowledge. Ethiopian study in which 89% of health training students showed adequate knowledge [21]. Moreover, another study in India and Malaysia revealed that female medical students exhibited "good" knowledge regarding breast self-examination (BSE) [22,23].

A noteworthy finding was the limited role of formal medical education as a source of BSE information. The most cited sources were the Internet and Audit/Presentation, while academic sources, including university, ranked fourth and represented only 11.5%. Parallel to our results, in the United Arab Emirates, Rahman et al. reported that among a population of Al-Sharja University undergraduate students, academic courses ranked last among the sources of information about BSE [20]. Similar findings have been reported among medical students from Kenya, media, including television and radio, were the main sources of BSE-related information, as mentioned by 65% of the participants, whereas only 7% mentioned health professionals [24]. In contrast, studies from Gaza and Egypt have shown stronger roles for university courses in providing breast health information [25,26].

Our results indicate that, in Benghazi, academic courses for students in undergraduate levels lack content associated with breast cancer screening and BSE. This highlights the necessity of including information about breast cancer in general and breast self-examination in particular in school and university programs for female students. Participants showed high awareness of key breast cancer symptoms and several major risk and protective factors, particularly family history, exposure to chest X-rays, hormonal therapy, breastfeeding, healthy diet, and regular exercise. Nonetheless, some established or plausible risk factors, such as exposure to pesticides, lack of physical activity, and certain reproductive factors, were less frequently recognized. This suggests that while general awareness is relatively good, more subtle education on specific risk profiles could further strengthen students' ability to counsel patients and the public.

Awareness of Symptoms, Risk, and Protective Factors

Awareness of classic BC symptoms (axillary lumps and comparable levels of recognition for asymmetry, discharge, and skin alterations) was relatively high. Over 85% of our sample correctly identified significant risk factors, including family history, hormone therapy, and medical radiation. Additionally, 80% of respondents accurately identified positive lifestyle factors, such as breastfeeding, regular physical activity, and a low-fat diet. This significant awareness among a health-conscious group aligns with that of other medical students [27].

The attitude toward BSE among female medical students

Regarding the attitude, we detected a favorable attitude towards BSE in a majority of students. Particularly, over 99% of respondents mentioned that BSE was either important or very important. Similar positive attitudes have been reported among medical and health science students in several countries; the findings revealed that most students held a positive attitude towards BSE, and 100% and 95.9% thought that performing BSE is required [23,27]. This indicated that involvement with BSE training in higher education could enhance understanding regarding early breast cancer diagnosis and possibly contribute to preventing the disease from advanced stages, hence reducing its mortality and morbidity rates

in Libya. However, in Ethiopia, the prevalence of negative attitudes was high, nearly above half between health professionals and students in medical disciplines [28]. Correspondingly, in India, Raghavan et al., found that Just under fifty percent of the participants demonstrated positive perception about BSE, whereas 51.4% (75/146) reported a negative attitude. Notably, positive attitudes toward BSE increased steadily from 38.9% among first-year students to 58.1% in the final year [29]. In a different study, about 50.6% of the participants reported a positive attitude towards the subject [30].

The practice of BSE among female medical students

The level of practice among students was generally low. only 18. 2% of medical students were practicing BSE. Data obtained in previous studies aligned with our results, in Iraqi study established that only 36.67% of medical students from Baghdad University practiced BSE, while 51.33% in the clinical group had never engaged in it [31]. This view was also supported by another study, where only 20% of the participants claimed to practice BSE [23]. Comparable findings were observed in many studies involving different communities. A study at King Saud University in Riyadh revealed that 57.4% of participants had moderate knowledge of breast cancer, although 64% showed a positive attitude towards the practice, only 18% consistently performed breast self-examinations [32]. Although breast cancer awareness is high, many female medical students do not regularly practice breast self-examination (BSE) [33]. We found a lower prevalence of breast self-examination (BSE) practice compared with some worldwide groups of medical students. In a Turkish study, 41. 6% of students reported practicing BSE, and about a quarter of students reported practicing BSE at least once a month [34]. Comparative data for Malaysian cohorts, only (25.5 %) performed BSE, and among those who practice BSE, only (31.2 %) respondents practice BSE once a month [14]. Data from the UAE at the University of Sharjah found that (28.8%) participants performed BSE, which is greater than what we have in our study [20]. Interestingly, a study from Sudan revealed a much higher practice rate among female medical students and reported a practice rate of 74.9% [27]. The variations in findings may be attributed to the differences in educational programmer and the low level of breast self-examination (BSE) practice among future healthcare providers. Non-medical students are likely to have less knowledge about BSE compared to medical students. This may be related to the lack of well-structured educational programmer that promote breast health awareness. Additionally, limitations in healthcare services, such as a shortage of trained educators and insufficient educational materials, may further reduce the practice of BSE.

Even though our data illustrated a low level of practice, the number increased dramatically with age 2. 1% in people 18-20 years vs. 42. 9% in people who are 30 years or older; $p = 0.0001$. This finding is similar to studies conducted in Malaysia and Indonesia where age was found to be a significant predictor of BSE [35,36]. An elevation was noted in practices about BSE as students progressed in their academic years, and reached a peak during the internship year. This showed corresponds with the findings of a prior study with female medical students. Good practice levels increased from 33.3% in the first year to 62.8% in the final year [29]. Knowledge scores were consistently high across academic levels, but attitude and practice scores showed statistically significant improvements from the first year (44.1% and 25%, respectively) to the final year of study (72.1% and 61.8%, respectively; $p < 0.001$) [22]. Similarly, actual BSE practice at the University of Sharjah was much higher among clinical year students than preclinical years, despite high levels of knowledge [20].

The difference in attitude and practice scores between academic years suggests that clinical exposure and patient contact might impact students' perception of BSE. This finding underscores the importance of introducing practical BSE training at an earlier stage in medical school. Female medical students generally possess a satisfactory level of knowledge regarding the primary signs, symptoms, and early detection methods for breast cancer. However, a significant gap remains between awareness and action, as the overall level of regular practice for breast cancer screening remains poor among this population [33].

Conclusion

The current study showed a significant gap between knowledge and practice of breast self-examination among female medical students in Benghazi University. Although female medical students had a relatively good level of awareness about breast self-examination (BSE) and breast cancer risk factors, their actual performance of regular BSE was poor. To bridge the gap between knowledge and practice, BSE training should be incorporated into the medical curriculum, complemented with hands-on experience and institutional commitment to the cause. Such efforts would empower the medical students to be effective advocates for breast cancer prevention and early detection.

Conflict of interest. Nil

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