Knowledge and Practice of Breast Self-Examination among University Female Students in Jordan: A Cross-Sectional Study

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ABSTRACT

Breast cancer rates are increasing and represents the most common type among Jordanian women. Early detection is the cornerstone of disease control. This study aimed to assess breast self-examination (BSE) knowledge and practice among undergraduate female students in Jordan. A cross-sectional study design using a convenience sample of 372 undergraduate female students. A modified, self-administered questionnaire covering three parts, the socio-demographic data, knowledge, and practice about BSE was used. Participants mean age was 19.7 years. The overall average knowledge level was 59.3 %. 67.7 % of respondents demonstrated a medium level of knowledge, while only 1.6 % had a good level of knowledge (scored > 79 %). The main sources of information reported by participants include TV & Radio (41.4), Magazines and Brochures (37.9 %). 18 % of the participants claimed they practiced breast self-examination. Students who are older, who study health sciences, in the fourth year, and those who received education about BSE demonstrated better performance than their peers. Students showed moderate knowledge level about BSE, with low practice level. Health education programs targeting young females in schools and universities around the country, and utilizing different sources are needed.

Keywords: breast cancer, BSE, knowledge, practice, undergraduate, female

INTRODUCTION

Worldwide, breast cancer is the most challenging health problem in women. Among all cancer types, breast cancer ranked number one among women and the second among both men and women combined[1]. The age-standardized incidence rate (ASIR) and the age-standardized mortality rate (ASMR) of breast cancer in 2018 were 46.3/100,000 and 13/100,000 respectively[2]. However, evidence of substantial different incidence rates of breast cancer was seen between developed and developing countries[3,4]. Between 1990 and 2017, the incidence rate of BC either decreased or showed only a modest increase in wealthy and developed countries; in contrast, it significantly increased in developing countries, particularly the poor countries[4]. Moreover, the poor countries witnessing low breast cancer survival rate compared with high-income countries[3].

In 2015, breast cancer in Jordan comprised 39.4% of cancer cases among women and 20.6% of all cancers among both men and women combined[5]. BC is indeed a significant national health concern, and its incidence and complicity have been increasing over the years. The ASIR of breast cancer among Jordanian women was 55 per 100,000 in the year 2013, compared with 40 per 100,000 in the year 2000[6]. The estimated 5-year survival rates of patients with breast cancer in Jordan ranged from 57.1 to 66.7%, which is lower than the reported survival rates in Iran and Egypt, for example[7]. Almost more than 50% of newly detected breast cancer cases were at stage 3 or stage 4 of the disease[8], and the average age of women at diagnosis of BC in Jordan was 10 years younger than counterparts in Western countries[9]. Several factors may contribute to this trend[10], including tobacco use, post-menopausal obesity, low vitamin D and high fat intake, contraceptive use, and lack of physical activity[11-14].

Although breast cancer diagnosis in younger women is less frequent, it has a greater negative impact than in older women, as it is often discovered at an advanced stage and tends to progress into an aggressive state[15]. However, breast cancer is among the few cancer types that can be discovered at early stages based on signs and symptoms, where early treatment can improve the outcome and reduce premature death[16]. Several screening methods to detect breast cancer are in use worldwide, and each has its own strengths and weaknesses[17]. It's worth noting that breast self-examination as an early BC detection approach is not recommended because some studies have revealed that the test lacks scientific evidence[18]. However, a recent large cohort study in Thailand found that women who practiced regular BSE had significantly smaller tumor sizes, earlier stages, and better survival rates than those who did not[19]. On the other hand, mammography screening stands out as the most recommended screening method and is usually recommended for women aged 40 years and above[20]. However, research findings indicate that the rates of false-positive and false-negative results tend to increase with decreasing age[21].

Limited studies have surveyed the knowledge, attitudes, and practices of Breast Self-Examination (BSE) among university students in

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Jordan[22-23]. The existing studies predominantly indicate either insufficient knowledge or low levels of practice. Moreover, most of these studies were conducted in specific settings and among groups that may not be representative of the broader population. Therefore, the aim of the current study is to evaluate the BSE-related knowledge and practice levels among undergraduate female students at Al-Hussein bin Talal University in the south of Jordan.

METHOD

Study design: A cross-sectional survey was adopted involving a convenience sample. A self-filled questionnaire was employed for collecting the pertaining data from September 1, 2019, to December 1, 2019.

Study setting and sample: The study was involved undergraduate female students from Al-Hussein bin Talal University, Ma'an, Jordan. The students in the hosting University comprising about ten thousand from different parts of Jordan. Inclusion criteria include female students who were registered in the undergraduate of the university and willing to participate in the study. The size of the study sample was estimated by online calculator based on the following formula (http://www.raosoft.com/samplesize.html): n=N*X/(X+N–1).

A sample of 357 was calculated with a margin of error of 5 %, 95 % confident level, population size of 5000, and sample proportion of 50 %. To take into consideration non-respondent students, a total of 450 copies of the study questionnaire were distributed. Potential participants were accessed during the time of getting out of lecture rooms based on the convenient time of the researchers over a month span.

Ethical approval was granted by Ethics Committee at Al-Hussein Bin Talal University. The study was explained to the potential participants and the student who agreed to participate in the study was given a copy of the questionnaire and asked to complete it and return it back immediately during the meeting, or at their own convenience and then to deliver it to the one of the researchers in their offices.

Study questionnaire: The study questionnaire was structured by the researchers upon previously published tools[24,25]. An English version of the questionnaire was prepared initially and then was translated to Arabic. Then the two versions were compared, and any discrepancies were addressed through discussion and revision until the translated questionnaire accurately conveyed the original meaning of questions. Then, two experts reviewed the relevancy of the questionnaire items before its use. After that, a pilot sample of 15 students who are not included in the actual study was used to test the readability and clarity of the questionnaire. The piloted respondents found the questionnaire to be clear and readable, therefore no substantial change was needed. The reliability test revealed Cronbach's alpha of 76 %.

The questionnaire is composed of three sections. The first section is designed to gather information about participants' socio-demographic characteristics and medical history. The second section was designed to assess the participants' knowledge about breast self-examination. BSE knowledge questions comprise 18 questions and are presented in true/false or don't know format and circle one of multiple choices (5 questions). Third set of questions asking participants whether they are practicing BSE. Participants' response of practicing or not practicing BSE was followed by multi-response questions asking them why practicing BSE for those who answered "yes" and why not practicing BSE for those who answered "no". They offered to choose all responses that represents their opinion.

Statistical analysis: The data collected were analyzed using SPSS software version 26. Descriptive statistics including mean and standard deviation for the continuous variables, and frequencies and percentages for the categorical variables were used. The mean percentage was obtained by dividing the mean score by the maximum score and multiplying by 100. The total scores were then categorized based on Bloom's cutoff point for KAP studies: "good" for 80-100% correct responses, "satisfying" for 50-79 correct responses, and "poor" for less than 50% correct responses. To compare the mean knowledge scores between groups, we used the independent samples t-test and one-way ANOVA. A p-value of ≤ 0.05 was considered as a significant cutoff.

RESULTS

Out of 450 students accessed, 56 had not returned their copies and 22 were excluded because they had substantial missing data. Three hundred seventy-two respondents were considered in the study revealing a response rate of 82.6 %. The age range of participants was between 17-27 years with an average of 19.7 years. Students of health sciences form the largest academic group, representing 38.2 % of the total sample. In terms of academic year, 39.8 % of the participants were in their first year and 28.8% of in the second year. Regarding permanent residency, 44.4 % of the participants stated that they reside in the southern governorates. More than nighty percent of respondents (90.3 %) stated that their menstrual period started at age 12-17, 11.8 % have family history of breast cancer, and 12.6 % have a history of breast changes (table 1).

Table 1. Medical history and sociodemographic characteristics of study participants.

Variable	N (%)
Age	
17-19 years	193 (51.9%)
20-27 years	179 (48.1%)
Academic area	
Nursing & allied health	143 (38.4)
Engineering, Scientific & IT	103 (27.7)
Art, low & business	126 (33.9)
Academic year	
First year	148 (39.8)
Second year	107 (28.8)
Third year	71 (19.1)
Fourth year	42 (11.3)
Fifth year	4 (1.1)
Residence	
North region	55 (14.8)
Middle region	152 (40.9)
South region	165 (44.3)
Menarche	
Before 12 years	28 (7.5)
Between 12-17	336 (90.3)
After 17 years	8 (2.2)
Family history of breast cancer	
Yes	44 (11.8)
No	328 (88.2)
Previous breast changes	
Yes	47 (12.6)
No	325 (87.4)

Table 2 demonstrates the participants' knowledge about BSE. Most respondents (79.3 %) have heard about breast self-examination. The average knowledge level of all participants was 59.3 %. A significant proportion (67.7 %) of respondents demonstrated a medium level

of knowledge (scoring between 50 % and 79 %), while only 1.6 % had a good level of knowledge (scored > 79 %). The main sources of information reported by participants include TV & Radio (41.4%), Magazines and Brochures (37.9 %), and Health Professionals (25.3 %).

Table 2. Respondents' knowledge scores and source of information about BSE.

Knowledge variable	Category	N	%
Have you heard about BSE	Yes	295	79.3
	No	77	20.7
Knowledge score	Overall average		59.3
	>=80%: High	6	1.6
	51%-79%: Medium	251	67.7
	<=50%: low	114	30.7
Source of information	TV & Radio	154	41.4
	Magazines & Brochures	141	37.9
	Health Professionals	94	25.3
	Academic	25	6.7
	Health Workshops	9	2.4
	Family	1	0.3

Sixty-seven participants (18 %) claimed they practice breast self-examination. Thirty-one (46.3 %) of them said they perform BSE monthly and 15 (22.4 %) perform BSE every three months and the rest perform BSE irregularly. When asked about the reasons for performing BSE, their most frequent responses were "to prevent future problems" (74.6 %), "because they are worried about getting breast cancer" (49.3 %), and "because the presence of family history of breast cancer" (26.9 %) Table (3). Out of the total participants, 305 (82 %) were not performing BSE. Their most frequent responses regarding the reasons for not performing BSE were "having a low chance of getting BC" (39.7 %), "not knowing how to perform BSE" (30.9%), and "not knowing why they should do it" (29.5 %) (Table 3).

Table 3. Practicing breast self-examination.

Variable	Frequency	Percent
Do you practice BSE?		
Yes	67	18%
No	305	82%
How often do you perform BSE (67)		
Every month	31	46.30%
At least once every three months	15	22.40%
Not regularly	21	31.30%
Reasons for practicing BSE (67)		
Presence of family history of BC	18	26.90%
Worry about getting BC.	33	49.30%
BC is a dangerous disease.	13	19.40%
To prevent future problems	50	74.60%
Reasons for not practicing BSE (305)		
I don't know how to do BSE.	108	30.90%
My chance of getting BC is low.	121	39.70%
Unexpected BC worried me.	66	21.60%
I believe it is not effective.	30	9.80%
I don't know why I should do it.	90	29.50%

Table 4 shows BSE knowledge scores according to selected variables. Age was associated significantly (p = 0.010) with BSE knowledge score with older students scored better than younger students. Additionally, students who practice periodic BSE (p = 0.014), had heard about BSE (p < 0.001) or had received education about BSE (p < 0.001) achieved significantly higher score than those who did not. The type of study showed a very significant association with BSE knowledge level (p <.001), with health specialty students obtaining the highest score. Furthermore, fourth-year students (p <.001), scored significantly higher compared with their counterparts. Interestingly, students with a family history of BC scored lower than those without (p = 0.033),

DISCUSSION

The study's results indicate that participants displayed varying levels of awareness and knowledge, ranging from relatively poor to moderate. Moreover, their practice of breast self-examination was generally inadequate. Specifically, while 79.3% of the participants reported having heard about breast self-examination, those who claimed they had performed the test were only 18%, and most of them did so irregularly. Earlier research has documented significant disparities across various countries including Jordan. In an earlier study conducted in Jordan, Suleiman[23] found that just 34.9% of a sample of 840 university students were aware of BSE, and 11% of them performed BSE. In contrast, Al Odwan et al.[28] reported a higher level of BSE engagement among a sample of university nursing students in Jordan, with 66.5% of them practicing BSE regularly. It is anticipated that nursing students would achieve higher scores in BSE knowledge and practice compared to general or non-health students. In our study, health students outperformed Art and Scientific students with statistical significance. Likewise, several studies elsewhere[29,30] have reported that health students exhibited superior knowledge and performance in BSE.

In line with our findings, several researchers have reported a range of knowledge levels regarding BSE, which fall within the low to moderate levels. For example, a study conducted in Palestine found that only 33% of a sample consisting of 1200 university students were aware of BSE, and less than 13% performed BSE[31].

Another study by Sapountzi-Krepia et al.[32] from Cyprus revealed that 58.3% of the study participants (102) had knowledge about BSE, but only 10.9% reported they performed BSE monthly. Conversely, there have been reports of similar awareness rates but notably higher levels of BSE performance among university students in Saudi Arabia[33] and in the United Arab Emirates[29]. The differences in reported findings may be attributed to variations in the socio-demographic characteristics of the study populations. The cutoff point used to define "good knowledge" could indeed be another factor contributing to this variation. Different studies have employed varied cutoffs, with some using the range of 70–100%, while others have set it at 50%. In our study, we defined a good knowledge level as a score of 80% or higher, while categorizing scores of 50% or lower as indicative of poor knowledge.

The primary motivating factors cited by our study participants who practice BSE were "to prevent the problem in the future," fear, and having a family history of breast cancer. Conversely, for those who do not perform BSE, the main reasons for their lack of participation were "having low risk for developing breast cancer," "lack of knowledge on how to conduct BSE," and "not knowing why they should do it." In addition, around 21% didn't practice BSE because they were worried about unexpected cancer" findings. The latter represents a negative form of fear, which can deter individuals at risk from seeking early detection. Lopez-Class et al.[34] noted that breast cancer was often perceived by women as equivalent to death. Abu-Helalah et al.[35] found that the most reported barrier among a sample of Jordanian women who had never attended mammography screening was the fear of the results. The wrong assumptions about breast cancer may account for some of the reasons why women with breast cancer present late to the treating centers with advanced stage of the disease[8]. This incorrect assumption can be corrected by exposing individuals to scientifically sound information through school and university curricula, as well

Table 4. Comparison of different variables in relation to BSE scores.

Variable	Value	N (%)	BSE knowledge score Mean (SD)	*F*	*t*	*p-value*
Age group	17-19 Y	193 (51.9%)	11.22 (2.26)		2.291	0.01
	20-27 Y	179 (48.1%)	11.84 (2.34)			
Specialties	Health	143 (38.4%)	12.12 (2.15)	9.8		<.001
	Science	103 (27.7%)	11.45 (2.46)			
	Art	126 (33.9%)	10.90 (2.23)			
Year of study	First	148 (39.8%)	10.90 (2.21)	5.398		<.001
	Second	107 (28.8%)	11.94 (2.17)			
	Third	71 (19.1%)	11.90 (2.43)			
	Fourth	42 (11.3%)	12.12 (2.32)			
	Fifth	4 (1.1%)	10.00 (3.16)			
Residency	North	55 (14.8%)	11.18 (2.21)	1.445	.	0.237
	Middle	152 (40.9%)	11.74 (2.25)			
	South	165 (44.4%)	11.42 (2.41)			
Heard about BC	Yes	360 (96.8%)	11.53 (2.33)		0.532	0.595
	No	12 (3.2%)	11.17 (2.04)			
Heard about BSE	Yes	295 (79.3%)	11.91 (2.22)		6.843	<0.001
	No	77 (20.7%)	9.99 (2.04)			
Been taught BSE before	Yes	224 (60.2%)	12.01 (2.25)		5.266	<0.001
	No	148 (39.8%)	10.76 (2.22)			
Has a family member with BC	Yes	44 (11.8%)	10.82 (2.38)		2.142	0.033
	No	328 (88.2%)	(2.30)11.61			
Examine breasts periodically	Yes	67 (18%)	12.15 (2.40)		2.481	0.014
	No	305 (82%)	11.38 (2.28)			

as through well-designed health education programs delivered to the general public[35,36].

Psychological factors have a more pronounced impact on young women when it comes to breast self-examination[36]. Therefore, training programs focusing on early diagnosis of BC can have a positive influence on regular BSE by reducing cancer-related fears. Research has suggested that younger women tend to experience high levels of anxiety, with factors like the fear of losing their feminine identity and changing body image[37,38]. However, several obstacles that delay the adoption of BSE were reported in literature, including lack of knowledge, disinterest, and forgetfulness[29], as well as fear of potential results and lack of awareness regarding the significance of breast self-examination[39]. Some individuals view BSE as unnecessary because they perceive themselves as healthy or BSE is a time-consuming activity. Such factors signal the need to implement educational programs and campaigns conducive to young women to improve their knowledge and encourage them to pursue regular BSE practice.

Recently, the Jordanian government has launched the Jordan Breast Cancer Program (JBCP) to enhance public awareness and knowledge about breast cancer, emphasizing mammography screening, and not recommending BSE[40]. The JBCP recommended that all women aged 40 years and older have universal access to screening mammography[9]. However, despite the government making the mammography services accessible to the majority of the target population in the country as part of the JBCP, many published studies have consistently reported low rates of mammography uptake among Jordanian women[41,22,35]. For instance, Othman et al.[22] reported that fewer than 10% of a population-based random sample of 1549 women had opted for mammography as a means of early cancer detection, and the primary reason for undergoing the test was their physician's recommendation. Similarly, in a study by Al-Mousa et al.[41], it was found that although 59.8% of a sample of 1353 surveyed women were aware of mammography, only 17.2% reported having undergone a mammography screening, with 66.2% of them making the decision to do so based on their physician's advice. Young women are at a higher risk of developing aggressive BC, and even those with early stage are at risk for more recurrence and mortality rates[42]. In Jordan, research revealed that younger women (> 30 years) diagnosed with BC have the lowest survival rate among all women with the disease[8]. Therefore, it is imperative to incorporate BSE into the array of early breast cancer detection methods, particularly for younger women.

In the current study, older students, those who study health sciences, in the fourth year, and those who received education about BSE demonstrated better performance than their peers. Interestingly, participants without a family history of breast cancer showed significantly better knowledge about BSE compared to those with family history. This finding is consistent with a study conducted among medical and non-medical university students in Egypt[43]. In contrast, Alsarireh & Darawad[21] found family history of BC is a positive factor of increased knowledge and practice of BSE. Moreover, Abu-Helalah et al.[35] found family history of BC was a predictor of awareness about and engaging in mammography screening. Apart from students, age and education have been identified as significant predictors of both knowledge and practice of BSE among women of general population[44].

The participants of the current study have their knowledge about BSE from different sources, and the most cited sources were TV and radio, written material, and health professionals. While academic sources including school and university studies ranked fourth and represented only 6.7%. These responses are inconsistent with studies from Gaza[45], Egypt[39], and Ethiopia[46] where the most stated sources were university courses, internet, and social media. In a previous study, only 5% of Jordanian university students claimed that their knowledge about breast cancer in general came from academic courses[47]. Like our findings, Rahman et al.[29] found academic courses ranked the last in the sources of information about BSE in a sample of undergraduate students from Al-Sharja University. Such findings indicate that academic courses

lack content related to BC and BSE for students across school and undergraduate programs. This urges the need to dedicate resources about breast cancer in general and breast self-examination in particular in the curricula of school and university programs for female students.

It's important to note that this study has limitations that render its results non-generalizable to the entire population of female university students of the country. Firstly, the study sample was convenient and secondly, the tool used was a self-administered questionnaire, making it prone to recall bias. However, the sample size was sufficient to draw a conclusion about the population of the specific setting where the study was conducted.

CONCLUSION

It was well evident that breast cancer poses a significant concern to public and officials in Jordan. The trend of the disease is increasing in incidence particularly among younger women when compared with other parts of the world. Persistence of insufficient knowledge and non-compliance with pre-screening activities and risk factor avoidance will exacerbate the problem. To control the rising morbidity and mortality rates and enhance the treatment outcomes, public awareness regarding BC in general and screening methods in particular is essential at this time. Well planned health education programs targeting young females in schools and universities around the country, and utilizing different sources are mandatory. Evidence based research is lacking regarding BSE in terms of benefit and harm consequences, therefore further research aligned with local culture and meeting real community needs is crucial.

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