

# Assessment of Knowledge and Awareness About Breast Self-Examination Among University Female Students in Saudi Arabia

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**Objective:** This study aims to evaluate the knowledge and awareness of female university students in Saudi Arabia about breast self-examination (BSE).

**Methods:** From January to March 2022, an online self-administered questionnaire covering socio-demographic data and BSE Knowledge was distributed to female students enrolled in Saudi universities. The survey link was disseminated online and through student leaders. Mann–Whitney and Kruskal–Wallis tests were used to determine associations between the categorical variables and the BSE knowledge scores. Logistic regression was used to report the best predictor(s) for BSE knowledge.

**Results:** Among 668 respondents, 65.5% were aged between 20 and 24 years, 47.8% were taking health-related courses, 69.2% were from urban localities, and 90.6% had no family history of breast cancer. Only 4.2% showed adequate knowledge about BSEs. Students studying in health sciences had a significantly better BSE knowledge score ( $p = 0.01$ ). Moreover, 26.5% knew that a BSE has to be completed each month, and a similar percentage of students were aware that a BSE should not be completed during the menstrual cycle. Approximately half of the students knew that 20 years old is the recommended age to start BSEs. Seventy-two percent were aware that they must look for abnormal breast changes and the importance of feeling the axillary area when performing a BSE. Additionally, 55.2% were aware that most breast masses are detected by women themselves.

**Conclusion:** Saudi female students' knowledge about BSEs is inadequate. It is advisable that BSE knowledge and practice be incorporated into the curriculum of middle and high schools, as well as university students' programs.

**Keywords:** breast self-examination, breast cancer, awareness

## Introduction

Breast cancer signifies a serious worldwide health issue, with more than 2 million women diagnosed globally in 2020 and 685,000 deaths.<sup>1</sup> Similar to other populations, breast neoplasms are most common among Saudi females. The latest data from the Saudi Cancer Registry (SCR) reported 2814 cancer cases in 2018 (31.8% of all cancer cases).<sup>2</sup> The same report revealed that the median age of diagnosis with breast cancer was 51 years, in comparison with 61 years in American women.<sup>3</sup> This implies that half of breast neoplasm (1407 cases) in women are diagnosed before the age of 51. In fact, only 43% of cancer cases in 2018 reported among Saudi women were in situ, compared with 64% in American women.<sup>2,3</sup> It should be noted that breast cancer diagnoses among younger women usually leads to undesirable prognoses, as they tend to be more aggressive in nature and at an advanced stage when diagnosed.<sup>4</sup>

Currently, several international organizations are no longer recommending the BSE as a screening tool,<sup>5</sup> instead, they have suggested that it is a useful mean for raising women's awareness about breast health and for women to become aware with the appearance of normal breasts.<sup>5</sup> Consequently, women can then notify their healthcare providers if they discover any abnormal changes. The American Cancer Society (ACR) has recently endorsed monthly BSEs, beginning from high-school.<sup>6</sup> This endorsement was supported by the fact that most breast lumps were self-reported by women.

Therefore, regular BSEs could potentially have an impact on populations where advanced-stage breast cancer is diagnosed in younger age groups, such as with Saudi women. However, this requires women to have sufficient knowledge about BSEs and the correct steps to perform such a test.

Recent studies in Saudi Arabia reported moderate knowledge (about 57%,  $n = 422$ ) of BSEs among King Saud University (KSU) students.<sup>7</sup> However, the number of those performing BSEs was poor, 18%, as reported. Another study that looked at students from the United Arab Emirates (UAE) showed higher levels of awareness of about 68.5% among respondents.<sup>8</sup> This research will assess the knowledge and awareness of BSEs among Saudi female university students from different academic specializations.

## Method

### Study Sample and Data Collection

This cross-sectional research was carried out between January and March 2022. The Jazan University Ethics Committee approved this research before the researchers commenced data collection.

The survey population was comprised of female undergraduates studying at Saudi universities. Participant recruitment was done using convenience sampling. The universities' student populations encompassed different regions in Saudi Arabia—middle, western, eastern, northern and southern. Staff from the radiography department of those Saudi universities were contacted to obtain the contact information of that college's student leaders. The student leaders from those targeted universities then invited students from different departments to participate. Females aged 18 years and above, currently enrolled as students, able to write and speak Arabic, and able to complete an online questionnaire competently were included in the study.

The survey was divided into two parts, having a total of 18 questions. The first part contained personal questions for the participants and demographic data. The second section was designed to gather information regarding the participant's BSE knowledge. The first 7 questions were multiple choice, and the rest (11 questions) were a choice between true, do not know or false. One point was allocated for each correct response, with no negative marking for wrong answers. The maximum score that could be attained for BSE knowledge was 18. The knowledge score was calculated as follows: more than 75% was regarded adequate knowledge, between 50% and 75% as moderate knowledge, and less than 50% as poor knowledge.

Before the distribution of the questionnaire to the study sample, it was piloted, and some questions were modified. The Cronbach's alpha coefficient was 0.82. The survey was disseminated online using google form to maximize geographical coverage and minimize time and cost. Participants consent form was required before completing the survey.

### Statistical Analysis

Firstly, frequencies, mean percentages, and standard deviation were reported for all items. Nonparametric tests (Mann–Whitney and Kruskal–Wallis) were used to examine relations between categorical variables and BSE knowledge. Logistic regression was used to report the best predictor(s) for BSE knowledge among female students. The significance level used was  $\leq 0.05$  and SPSS v23 was used for analysis.

## Results

### Participant Demographics

A total of 668 female students were included in this study. As shown in Table 1, 97.5% of them were undergraduate level, and 41.8% of the participants were in their fourth year or above. Looking at academic specialization, about half of the participants were studying health-related courses, with the remaining specializations constituting less than 10% of the study sample. The sample members were distributed across five regions in Saudi Arabia, from which the southern region had the highest percentage of female students (57%), and the eastern and northern regions had the lowest levels of participation. About 69.2% of the students live in urban areas, and around 30% live in rural areas. The results showed that 9.4% of study sample had a genetic history of breast cancer, and 23.4% of students stated that a friend or a family member had been diagnosed with breast cancer. Only 2 students reported that they had breast cancer.

**Table I** Demographical Characteristics of Respondents (N=668)

Variable	Category	Frequency (%)
<b>Age group</b>	18–19	184 (27.5)
	20–24	438 (65.5)
	≥25	46 (7)
<b>Academic stage</b>	University	651 (97.5)
	Postgraduate	17 (2.5)
<b>Academic year</b>	First	160 (24)
	Second	122 (18.3)
	Third	107 (16)
	Fourth or above	279 (41.8)
<b>College</b>	Preparatory Year	53 (7.9)
	Health Specialties	319 (47.8)
	Business Administration	53 (7.9)
	Humanities and Arts	43 (6.4)
	Faculty of Education	23 (3.4)
	College of Sharia and Law	21 (3.1)
	College of Science	56 (8.4)
	College of Engineering and Technology	46 (6.9)
	College of Computer Science and Information Technology	54 (8.1)
	<b>Region</b>	Southern Region
Eastern Region		32 (4.8)
Northern Region		31 (4.6)
Western Region		134 (20.1)
Central Region		90 (13.47)
<b>Living location</b>	Rural	206 (30.8)
	Urban	462 (69.2)
<b>Does your family have a history (genetic) of breast cancer?</b>	No	605 (90.6)
	Yes	63 (9.4)
<b>Has a family member or friend ever been diagnosed with breast cancer?</b>	No	512 (76.6)
	Yes	156 (23.4)
<b>Have you ever been diagnosed with breast cancer?</b>	No	666 (99.7)
	Yes	2 (0.3)

## Knowledge of Breast Self-Examination (BSE)

The scale for measuring students' knowledge of BSEs consisted of 18 items; 7 of the items were multiple-choice questions and 11 items were answered with either true, false or I do not know (Tables 2 and 3). The percentage of correct answers for the multiple-choice responses ranged between 7.9% and 76%, and between 17.5% and 82% for "True, False or I don't know" items. The overall mean percentage of correct answers was 49.62%.

## Demographic Variables and BSE Knowledge

The results indicated that there was a significant variation in responses between the different university colleges. Students from health-related courses showed higher knowledge ( $p < 0.001$ ). Post hoc pairwise comparison analysis revealed that this significant difference occurred between students in the college of Sharia and Law, Engineering and Technology, Arts and Humanities, Business Administration, Computer Science and Information Technology and those in health-related specializations. Regarding regional differences, post hoc pairwise comparison analysis revealed that there was a significant difference between students living in the eastern and western regions compared with those living in the southern region (Table 4).

**Table 2** The Participants' Answers of Multiple Responses Items (N=668)

Item	Answer	Frequency	%
How often should a breast self-exam be performed?	Do not know	149	22.3
	Once a week	3	0.4
	<b>Once every month</b>	177	26.5
	Once every 6 months	339	50.7
The majority of breast lumps are detected by	Do not know	108	16.2
	<b>Women themselves</b>	369	55.2
	Mammography	150	22.5
	Doctors	41	6.1
When talking about recovery from breast cancer, what difference do you think a regular breast cancer screening makes?	Do not know	84	12.6
	Little or no difference	14	2.1
	Some difference	62	9.3
	<b>Huge difference</b>	508	76.0
In the postmenopausal period, how often should you do a breast self-exam?	Do not know	250	37.4
	<b>Every month</b>	53	7.9
	Every 3 months	365	54.6
During the examination, upon palpation of the breast, you should:	Do not know	161	24.1
	<b>Use the sole of the fingers</b>	152	22.8
	Use the tip (head-to-front) of the finger	355	53.1
Abnormal breast changes include all of the following:	Do not know	87	13.0
	Secretions	4	0.6
	Pitting of the skin (the appearance of the skin of an orange)	8	1.2
	Lumps, hard knots, or thickening in the breast	83	12.4
	None of the above	5	0.7
	<b>All of the above</b>	481	72.0
At what age should a woman start periodic breast self-examination?	Do not know	125	18.7
	20	329	49.3
	30	101	15.1
	35	113	16.9

## Degree of BSE Knowledge

More than half of the participants (58%) had poor knowledge, while only 4.2% of the participants showed adequate knowledge about BSEs. The average knowledge score was  $8.5 \pm 3.3$ . These results indicate that most participants had poor or moderate knowledge about the importance of BSE in breast cancer diagnoses (Table 5).

**Table 3** The Answers of (True or False) Items (N=668)

Item	Answer	Frequency	%
A woman who checks her breasts regularly does one of the most common cancer-detecting things?	False	12	1.8
	Do not know	59	8.8
	<b>True</b>	597	89.4
A mammogram detects lumps that cannot be felt	False	19	2.8
	Do not know	101	15.1
	<b>True</b>	548	82.0
Mammograms are recommended for women at age 50 and over	False	157	23.5
	Do not know	220	32.9
	<b>True</b>	291	43.6
Using the palm of the hand for examination is the most effective way to detect lumps in the breast	<b>False</b>	205	30.7
	Do not know	204	30.5
	True	259	38.8
Breast self-examination should be done during the menstrual cycle, as it is easy to detect and feel the lumps	<b>False</b>	244	36.5
	Do not know	256	38.3
	True	168	25.1
It is not necessary to look at the breasts during a breast self-exam	<b>False</b>	388	58.1
	Do not know	163	24.4
	True	117	17.5
With age, some nipple discharge is expected during a breast self-examination	False	135	20.2
	do not know	367	54.9
	<b>True</b>	166	24.9
Feeling for lumps under the arm is an important part of a breast self-exam	False	30	4.5
	Do not know	149	22.3
	<b>True</b>	489	73.2
Pressure on the nipple is necessary for a good examination	False	82	12.3
	Do not know	283	42.4
	<b>True</b>	303	45.4
With age, the risk of breast cancer increases	False	38	5.7
	Do not know	153	22.9
	<b>True</b>	477	71.4
Having a mammogram replaces the need for a breast self-exam or clinical examination by a doctor or nurse	<b>False</b>	260	38.9
	Do not know	211	31.6
	True	197	29.5

**Table 4** Knowledge Scores and Association According to Demographic Characteristics

Variable	Category	Frequency	Mean Score	SD	P-value
Academic stage*	University	651	8.50	3.31	0.872
	Postgraduate	17	8.41	3.12	
Academic year**	First	160	7.78	3.56	0.081
	Second	122	8.07	3.50	
	Third	107	8.51	3.13	
	Fourth or above	279	9.10	3.03	
College**	Preparatory Year	53	7.83	3.87	0.00
	Health Specialties	319	9.43	3.00	
	Business Administration	53	7.30	3.65	
	Arts and Humanities	43	7.58	3.39	
	Faculty of Education	23	8.22	2.59	
	College of Sharia and Law	21	7.29	2.53	
	College of Science	56	8.20	3.57	
	College of Engineering and Technology	46	7.33	2.81	
	College of Computer Science and Information Technology	54	7.54	3.29	
Region**	Southern Region	381	8.86	3.37	0.00
	Eastern Region	32	7.34	2.51	
	Northern Region	31	8.77	2.99	
	Western Region	134	7.96	3.52	
	Central Region	90	8.13	2.81	
Living location*	Rural	206	8.80	3.32	0.001
	Urban	462	8.37	3.30	

Note: \*Mann–Whitney test, \*\*Kruskal–Wallis test.

**Table 5** The Degree of BSE Knowledge (N=668)

BSE Knowledge Level	Frequency	%
Poor knowledge	392	58.7
Moderate knowledge	248	37.1
Adequate knowledge	28	4.2
Mean ± SD	8.5 ± 3.3	

**Table 6** Multivariate Logistic Regression Analysis of Independent Predictors of BSE

Variables	P-value	OR	95% CI for OR	
			Lower	Upper
<b>Age</b>				
18–19 (ref)				
20–24	0.13	0.62	0.34	1.14
≥25	0.55	0.74	0.28	1.97
<b>Academic Level</b>				
First Year (ref)				
Second Year	0.36	1.36	0.71	2.61
Third Year	0.36	1.43	0.67	3.04
Fourth Year and Above	0.21	1.57	0.78	3.15
<b>Region</b>				
Middle Region (ref)				
Eastern Region	0.44	0.68	0.26	1.80
Western Region	0.46	1.31	0.64	2.65
Southern Region	0.74	1.11	0.61	2.03
Northern Region	0.58	1.40	0.43	4.52
<b>College</b>				
Non-medical colleges (ref)				
Medical colleges	0.01	0.56	0.36	0.88
<b>Knowledge Score</b>	<b>0.00</b>	1.30	1.18	1.43

## Logistic Regression Analysis of Independent BSE Predictors

Regression findings show that being a student in a health-related specialization is a significant predictor of better BSE knowledge and a higher score ( $p = 0.01$ ). No other associations were found (Table 6).

## Discussion

This study updates the existing data regarding Saudi female university students' awareness and knowledge of BSEs. A recent study carried out among female KSU students showed moderate BSE knowledge (57%).<sup>7</sup> In comparison, 37% of our study participants reported moderate BSE knowledge. Previous studies have reported wide variations in terms of BSE knowledge among different nations. In India and Korea, knowledge has been reported as high as 93% and 87%, and as low as 8.7% in Ethiopia.<sup>9</sup> It was suggested that the difference in the findings between the studies could be related to differences in the study population's demographics and socioeconomic status. Another potential reason for this variation could be related to the threshold of knowledge cut-off.<sup>10</sup> Some studies have reported 80–100% as good knowledge and some as less than or equal to 40%. In this study, >75% was used to represent adequate knowledge.

In terms of BSE frequency and age recommendations, only 26.5% of the participants knew that a BSE has to be completed on a monthly basis. This figure was lower than that reported for KSU and Taif students, where 81% and 89% were aware that a BSE is performed on a monthly basis.<sup>7,11</sup> Additionally, 49% of the students in this study knew that 20 years old is the recommended age for commencing BSEs. This was slightly higher than the recently reported figure for Ethiopia, which was 43%.<sup>10</sup>

Regarding the correct maneuvers for performing a BSE, only 22.8% were aware that they needed to use the sole of the finger upon palpation of the breast. Recent research on Ethiopian female students showed that only 16% had current knowledge about how to carry out a BSE.<sup>10</sup> A surprising finding from this study was that 75% of the women answered “do not know” or ‘true’ to whether a BSE should be done during the menstrual cycle. This was close to what was reported for KSU students, in which 63% answered that they do not know or yes to the same question.<sup>7</sup> In comparison,

70% of The Palestinian students knew that a BSE is performed one week after the beginning of menses.<sup>12</sup> This is a vital finding, as performing a BSE during the menstrual cycle would lead to faulty results, as women may mistake changes from the cycle, such as a swollen breast or lump, as abnormal changes.

On the other hand, acceptable knowledge was seen among study participants, in which 72% were aware of what constitutes abnormal breast changes, such as secretions, lumps from pitting of the skin, hard knots or thickening in the breast. In addition, 73% were aware of the importance of feeling the axillary area when performing a BSE, which is a common cancer site. A similar figure was reported among KSU students (77%).<sup>7</sup> Finally, this study found that students were aware that most breast masses are self-detected by women (55.2%). Clear recognition of breast cancer signs is critical for early prognosis and intervention.

The strength of the current study is in the variation of the students' specializations and geographical region. Limitations to be noted include the limited sample size, which may not be adequate to represent the entirety of our country. Furthermore, we did not ask students about how frequently they performed BSEs and whether they did so regularly, as it was not part of the study's objectives.

## Conclusion

This study found that Saudi female students' awareness and knowledge of BSEs is inadequate. As a result, there is an urgent need to implement a women's health information campaign among adolescent females to expand their awareness of BSEs. Proper education of university students about early detection methods for breast cancer, including BSEs, could assist in increasing their awareness before they reach the age group for mammography screening. It is advisable that BSE knowledge and practice be incorporated into the curriculum of middle and high schools, as well as university students' programs.

## Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Jazan University (REC76/1/004).

## Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

## Data Sharing Statement

The data is available upon request.

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## Disclosure

The authors declare no conflicts of interest in this work.

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