

Original Paper

Awareness of Pre-Graduating Female Students Concerning Early Detection of Breast Cancer at University of Kerbala, Iraq in 2025

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ABSTRACT

Background: Breast cancer is a major killer in women globally and in developing regions where the early cancer detection facilities are unavailable. Awareness would be a tool to fight this disease through early detection and there by decrease the morbidity and mortality. This study aimed to assess the awareness of pre graduating female students regarding early detection of breast cancer at University of Kerbala in Iraq. **Methods:** A cross- sectional design was conducted from 27th January 2024 to May 2025 at Kerbala University. A non-probability, quota sampling was used to select 100 pre graduating female students. The tool used in this study comprised of two parts: demographic characteristics and students' awareness regarding early detection of breast cancer. Valid and reliable questionnaire was used to collect data. **Results:** The most of female students were pre graduated from humanity colleges, with age group of (21-24) years. The level Awareness of female students regarding early detection of breast cancer was moderate. There is a statistically significant relationship between college classification and their awareness, also There is a significant relationship among the level of awareness and family history of breast cancer, and clinical breast examination experience. **Conclusion:** The moderate awareness levels observed among female students, coupled with significant deficiencies in key areas of breast cancer detection knowledge. There was a significant relationship between type of college and students' awareness. Add Educational program to educate students about new screening procedure and its importance for breast cancer screening.

KEYWORDS *Safety; Awareness; Pre-Graduating Students; Breast Cancer; Early Detection*

1-INTRODUCTION

The incidence of Breast cancer (BC) is largely seen in developed regions, and the relative mortality rate is observed to be higher in developing regions. Education for women is suggested for the early detection and treatment of this cancer in all regions. The plans for controlling and preventing this malignancy should top the list of health care planning in the less developed regions [1]. In 2022, it was estimated that there were (2.3) million women with breast cancer and (670 000) deaths worldwide. BC finds its presence in all countries across the globe among women of any age group after puberty but with rising rates among women advancing into later life years [2].

The most common cancer among Iraqi women is Breast Cancer. There were 8,708 cases of BC among females. Accounts for 34.8% of all cancers among females. The Annual Statistical Report was (65.5/100,000) for the Iraqi female population. The five governorates with the highest were: Erbil (92.3 /100,000), followed by Baghdad (83.8/100,000), then Kerbela with (80/100,000), Al-Najaf with (71.4/100,000) and Al-Basrah with (69/100,000). The mean age at diagnosis was 53.7 [3].

Early detection of breast cancer through awareness, regular breast self-examinations (BSE), clinical breast examinations (CBE), and mammography significantly improves prognosis and survival rates [4]. Awareness and adequate knowledge of these screening methods play a crucial role in encouraging women to engage in preventive health behaviors and help in overcoming some negative thoughts, notions, as well as taboos, associated with BC, thereby making way for a successful health care system. The implementation of BC screening programs in larger numbers among the mass population will additionally increase the decline in prevalence [5]. Important gaps are still present in self-examination practices and levels of engagement. Socioeconomic status play critical roles in determining levels of BC knowledge. Targeted health interventions are required in this context to overcome these gaps and enhance preventive practices in university students among females [6].

Effective community-based interventions may incorporate collaboration among healthcare providers, community organizations, and outreach programs. This allows a holistic method of dealing with multiple barriers. Healthcare providers present expertise related to the medical areas. Community organizations are aware of the needs of the community. Outreach programs assist with access during the screening process [8,9].

Female university students form an important segment of society, as they will be professionals and influential members of their families and communities in the future. The university period represents a critical stage for developing health awareness and positive attitudes toward preventive practices. However, studies have reported inconsistent knowledge and awareness with regards to breast cancer and its early detection methods among female university students. Though various studies were conducted on breast cancer in different populations, few studies are specifically presented on university female students' awareness about early detection methods, particularly related to specific regional and cultural contexts. Identifying the gaps in awareness of this population is of paramount importance for the development of targeted educational and preventive intervention. The present study has been conducted with the aim of assessing the level of awareness of university female students concerning early detection methods of breast cancer, and socio-demographic variables associated with their awareness.

2-METHODS

A cross-sectional design was conducted from 27th January 2024 to May 2025. A non-probability quota sampling method was employed to select 100 females selected as the study sample size. They were selected from female students at the University of Kerbala, College of Nursing, College of Applied Medical Sciences, College of Engineering, College of Administration and Economics, College of Education for Human Sciences, College of Physical Education and Sports Sciences

Inclusion criteria

Female students enrolled at the university during the study period. Aged 18 years and above. Enrolled in any college or academic program, whether medical, health-related, or non-medical. Willing to provide informed consent to participate in the study.

Exclusion Criteria

Individuals who refuse to participate or do not provide informed consent. Students who did not complete the questionnaire or submitted incomplete responses. Individuals with a personal history of breast cancer, as prior diagnosis may bias awareness levels. Students who attended formal training programs specifically focused on breast cancer within the past year.

Ethical Considerations

The study instrument was reviewed and approved by the Research Ethics Committee of the College of Nursing, University of Kerbala. Official authorization was granted to conduct the study in University of Kerbala. Before initiation the study, formal administrative approval was obtained and verbal consent was obtained from each female student prior to participate in the study. Explain to each participant before applying the tool to gain her confidence and trust. Data was confidential and using coding system for it. Each participant has right to withdraw from the study at any time.

Instrumentation

The tool used in this study comprised of *Two Parts: First part:* Demographic variables include (college classification, age, marital status, residence, family history of breast cancer, clinical breast examination experience, attending seminars on early detection, and practicing breast self-examination). *Second part:* The awareness of students regarding early detection of breast cancer contains eleven questions was used to assess the level of awareness after assess the internal consistency of this scale (Cronbach's Alpha: 0.94).

Data Analysis

Data were analyzed through the use of Statistical Process for Social Sciences (SPSS) version 23 by using descriptive and inferential statistics. Descriptive statistics such as mean and standard deviation were used to analyze demographic characteristics. Inferential statistics such as qi-square were used to examine the significance level was set at < 0.05 .

3-RESULTS

Table (1) represent the demographic characteristics of the study sample and their association with awareness of early detection of breast cancer. This table shows the most of study samples (76%) were Non-Medical Students and the other student (24%) were form health and medical students. The majority age group was (21-24 years) were (76%) followed by those aged more than 25 years (13%), and those aged less than 21 years (11%). Most of the study participant were single (79%) and their resident in urban area (72%). A statistically significant association was found between college classification and awareness of early breast cancer detection (χ^2 test, $p = 0.029$), with students from health and medical colleges demonstrating higher awareness than non-medical students. Family history of breast cancer was also significantly associated with awareness ($p = 0.009$), as students who reported having an affected relative showed higher awareness scores. Attendance at seminars on early breast cancer detection was significantly associated with awareness ($p = 0.003$), as was practicing breast self-examination ($p = 0.011$). In contrast, age ($p = 0.235$), residence ($p = 0.470$), marital status ($p = 0.290$), and previous personal history of breast cancer ($p = 0.402$) were not significantly associated with awareness levels. Although clinical breast examination experience showed a statistically significant association ($p = 0.046$), the proportion of students who had undergone such examinations was low (7%).

Table (1): Demographic characteristics (n=100)

Variables	Frequency	Percentage %	P-value	Sig.
Colleges classification				
Health and Medical Students	24	24	0.029	S
Non-Medical Students	76	<u>76</u>		
Age				
Less than 21 years	11	11.0	0.235	NS
21-24 years	76	<u>76.0</u>		
More than 25 years	13	13.0		
Residency				
Rural	28	28.0	0.470	NS
Urban	72	<u>72.0</u>		
Marriage Status				
Married	17	17.0	0.290	NS
Single	79	<u>79.0</u>		
Divorce	4	4.0		
Does one of your relatives have breast cancer				
Yes	16	16.0	0.009	S
No	84	<u>84.0</u>		
Have you had clinical breast examination at health centers				
Yes	7	7.0	0.046	S
No	93	<u>93.0</u>		
Have you attended previous seminars on early detection				
Yes	16	16.0	0.003	S
No	84	<u>84.0</u>		
Do you perform breast self - examination on a monthly or annual basis				
Yes	10	10.0	0.011	S
No	90	<u>90.0</u>		
Have you previously had breast cancer or did you show signs of it?				
Yes	3	3.0	0.402	NS
No	97	<u>97.0</u>		

Using the chi-square (χ^2) test to calculate P-values; Sig.= Significant at p-value < 0.05

Table 2 represents students' awareness of females regarding early detection of breast cancer. This table shows mean scores with standard deviations. The overall mean awareness score was 1.37 ± 0.44 , indicating a moderate level of awareness. High awareness was observed for only one item: understanding the purpose of breast cancer screening (mean = $1.67 \pm \text{SD}$), with 67% of students answering correctly. Moderate awareness was identified in six items, including knowledge of clinical breast examination frequency (mean = 1.56 ± 0.50),

definition of breast self-examination (mean = 1.56 ± 0.50), alternatives to mammography (mean = $1.38 \pm SD$), use of mammography as a screening tool (mean = 1.44 ± 0.50), overall early detection measures (mean = 1.37 ± 0.44), and general knowledge of early detection (mean = 1.48 ± 0.50). Low awareness was evident in four critical areas: correct timing of breast self-examination (mean = $1.17 \pm SD$), understanding of mammography (mean = 1.21 ± 0.41), confirmatory diagnostic tests for breast cancer (mean = 1.20 ± 0.40), and recommended age to initiate routine breast examinations (mean = 1.12 ± 0.33). These findings indicate substantial knowledge gaps in essential components of early breast cancer detection.

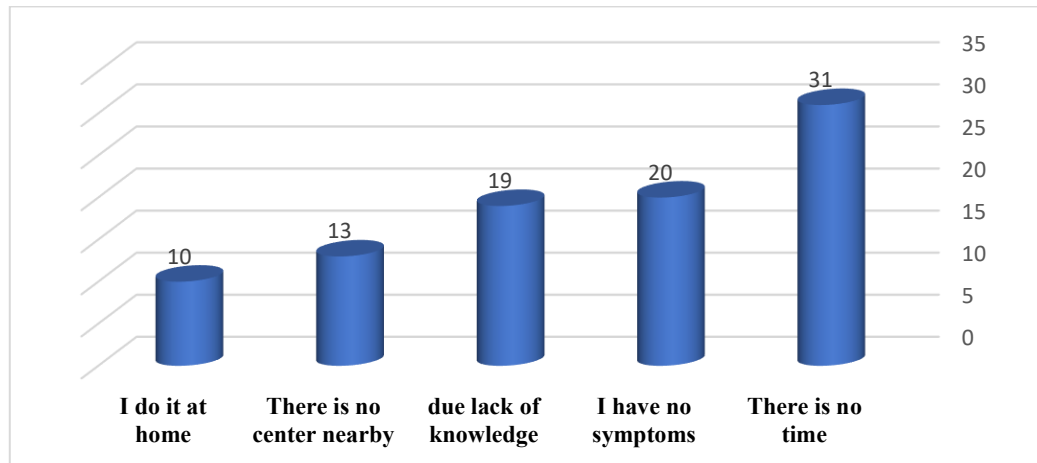


Figure 1: Illustrates the reported reasons for not undergoing clinical breast examination among study participants. The most frequently cited reason was lack of time, followed by other barriers, such as perceived lack of necessity and limited access to health centers. This finding reflects practical and motivational barriers that may contribute to the low uptake of clinical breast examinations observed in this population.

Table (2):Female Students Awareness Regarding Early Detection of Breast Cancer

	Items	True		False		Mean score	± SD	Awareness level
		f.	%	f.	%			
1	The purpose of BC screening tests is	67	67.0	33	33.0	1.67	± 0.47	High
2	Frequency rate of clinical breast examination by a doctor	56	56.0	44	44.0	1.56	± 0.50	Moderate
3	Self-examination is when a woman examined herself by sight and touch and is done regularly	56	56.0	44	44.0	1.56	± 0.50	Moderate
4	When do you do a breast self-examination?	17	17.0	83	83.0	1.17	± 0.38	Low
5	The mammogram examination is	21	21.0	79	79.0	1.21	± 0.41	Low
6	What are the alternatives to mammogram for BC screening?	38	38.0	62	62.0	1.38	± 0.49	Moderate
7	The best test to confirm BC is?	20	20.0	80	80.0	1.20	± 0.40	Low
8	Mammography examination is used as a screening	44	44.0	56	56.0	1.44	± 0.50	Moderate
9	In general, it is recommended for every woman to undergo a routine examination one a year, starting at age	12	12.0	88	88.0	1.12	± 0.33	Low
	All items for early detection	48	48.0	<u>52</u>	52.0	1.37	0.44	Moderate
	Knowledge of students about early detection of breast cancer	28	28.0	<u>72</u>	72.0	1.48	0.50	Moderate

(Low = 1.00–1.33, Moderate = 1.34–1.66, High = 1.67–2.00); SD: Standard Deviation

4-DISCUSSION

The study results revealed a concerning trend, while female students exhibit moderate overall awareness regarding early detection of breast cancer, significant gaps persist in critical areas. Specifically, knowledge about the timing and frequency of breast self-examinations (BSE), understanding of mammography, and awareness of appropriate screening initiation age are notably deficient. The moderate awareness observed in this study may be attributed to limited structured educational programs on breast cancer within university curricula. These findings are consistent with a study carried out in Hail University, Saudi Arabia (Almeshari et al., 2023), which reported similar awareness levels among university students. Similarly, the results of a study in three countries: Jordan, Egypt, and Syria (Gamal et al., 2025), where public awareness of breast cancer was still quite limited and had negative influence on the BC early detection. While, the students' awareness and attitude toward BSE was low: (16.4%), (17.4%), and (26.8%) for Egypt, Jordan, and Syria, respectively [10]. The present findings align with study findings of Rezaei et al. (2025) in Iran, which found that over a third of female students showed moderate and poor levels of knowledge, a third showed a negative attitude, and most showed inappropriate practices with regard to breast cancer screening. It is recommended to implement educational interventions to enhance the awareness level of people towards breast cancer screening [11]. Also, these findings align with those of Akyurt et al. (2025) among Turkish females showed a lack of knowledge regarding the breast cancer and screening strategies and a low rate of breast screening practice as well as a low score for the perceived susceptibility and severity of breast cancer [12]. In same to [Qtaishat et al. \(2025\)](#) carried out study in the MENA region that reported the knowledge level of breast cancer, risk factors, and early detection techniques among Arab women was not satisfactory [13]. Also, another research by Mohamed (2021) at Cairo University in Egypt, the findings indicated the level of awareness and knowledge regarding breast cancer and BSE as moderately adequate. Accordingly, the need for enhancing the practice of conducting public intervention activities, which would raise the level of community awareness and the regularity of the practice of BSE among the females, is of utmost importance [14]. Moreover, (Ben El-Fakir et al., 2024) concluded, there exists an important need to improve awareness of risk factors, symptoms, and breast self-examination techniques for young women in Morocco. Educational programs for college students will prove important for promoting early detection and improving attitudes related to breast health [15].

These study results are in agreement with research of Dedey et al., (2025) reported the level of general knowledge of breast cancer among the Senior High School students in Southern Ghana was inadequate, especially regarding the risk factors for breast cancer, breast self-examination, and the screening for breast cancer. Breast cancer health education should be made part of the national health curriculum and the specific risk factors and breast self-examination should receive particular emphasis [16]. Similarly, the study in Iran determined that > 87% of the students were had inadequate knowledge about breast cancer screening (Mohebi et al., 2023) [17]. Also, the present findings are consistent with those of Hussain et al. (2022) who reported that female students of the university in Pakistan were less aware about the risk factors, symptoms, and breast examination associated with breast cancer. This research work has brought forth the requirement for the start of intensive actions regarding awareness about breast cancer among the literate as well as illiterate female [18]. Our findings align with those of (Garai et al., 2025) in Hungary, demonstrated the highest proportion of students (57.8%) was in the moderate knowledge group, while less than a quarter (21.9%) achieved high knowledge. Students' knowledge could be improved, especially in terms of knowledge about the risk factors. Breast self-examination education may improve students' Preparedness and hence could achieve better prevention and early detection [19]. Similarly, (Ekpunobi et al., 2025) in Nigerian university found considerable knowledge deficits were still present in terms of risk factors, symptoms, and methods of early detection [20]. Also, those of (Zhou, 2025) demonstrated that a critical gap in knowledge, attitudes and practices levels exists concerning breast cancer screening practices in China's women, specifically in the lower income group. In order to increase the screening rates, it is necessary to work on these barriers, increase awareness, and provide improved risk calculator resources [21]. (Mally et al., 2024) concluded the most of them were ignorant about the various screening methods for early detection of breast cancer. Besides, some of the risk factors were not known, as evidenced by low uptake in breast cancer screening services among the study participants in the Oldest University of Tanzania [22].

In contrast, a study conducted among university students in Asir, The Kingdom of Saudi Arabia, by (Hani et al., 2025) found that good awareness and perception of breast cancer, especially with regards to early diagnosis and the tools for detection that are available. But knowledge of breast factors for cancer risk was significantly limited [23]. Also, the present findings are contradiction with those of (Newton et al., 2025) in a Nigerian university, which showed a high level of awareness regarding BSE among undergraduate students,

with knowledge gaps regarding practice [24]. The discrepancy between studies may be explained by variations in sample characteristics, study settings, and the availability of structured breast cancer awareness programs. Concerning colleges classification of students, There is a statistically significant relationship between students' field of study (Health and medical verse Non-Medical) and their awareness level of early breast cancer detection. The findings of this study are in agreement with results of (Akter and Ullah, 2022) stated the awareness level regarding breast cancer is low for university students as well as moderate for medical students. Health education programs related to every educational institution are needed as an urgent requirement to increase awareness levels for female students, which will ultimately increase women's health at home as well as abroad [25]. In addition, (Ben El-Fakir et al., 2024) indicated significant associations between knowledge levels and options studied [15].

In terms of age, the majority of respondents (76%) were aged 21–24, yet awareness levels did not significantly vary across age groups. This contradicts some prior assumptions that older students may have higher health literacy due to life experience. Similarly, residency whether rural (28%) or urban (72%), did not significantly impact awareness. This finding diverges from research by (Khachal et al., 2023) reported that participants belonging to the age group of 21 – 25 years have the highest overall knowledge. Yet, 64% and 31% of the participants could not identify the early symptoms of breast cancer and are not even aware of the significance of the practice of breast self-examination in the early detection of breast cancer, respectively [26]. Also, these contradiction with those of (Ben El-Fakir et al., 2024) who reported there were significant associations between knowledge levels and age of students [15]. Marital status: the majority of participants 79% were single also did not significantly associated with awareness, even though some literature suggests that married women may be more health-conscious and proactive in preventive screenings. The results here indicate that marital status may not influence breast cancer awareness among young female students, possibly due to a shared lack of educational exposure. This finding agrees with those of (Oglat et al., 2024) conducted research among Jordanian female students, they demonstrated their study had 98.41% of them being single [27]. In addition, (Abdullah et al., 2022) carried out research in Iraqi Diyala Governorate who highlighted that there was no relationship between the level of knowledge and marital status [28].

Surprisingly, only 16% of participants reported a family history of breast cancer, and this factor also showed significant relationship with increased awareness. This consistent with (Baral et al., 2025) concluded family history has a very significant association with the chances of acquiring the disease. It has been recommended that increased breast cancer awareness can be very effective in reducing death rates [29]. (Sana et al., 2025) stated having a family history of cancer was associated with increased awareness about warning signs [30]. In same to (Wu et al., 2023) demonstrated the participation rates in breast cancer screening were affected by breast disease, and family history of BC. Hence, urgent demand for raising breast cancer awareness and early detection in China [31].

Furthermore, only 7% had undergone clinical breast examinations, and 10% practiced BSE, revealing alarming gaps in preventive behavior. Most students (93%) had not attended seminars on early detection, confirming that lack of exposure to awareness activities contributes directly to knowledge deficits. This agrees with (Alanazi et al., 2025) reported the performance of BSE was very low. This was observed due to the lack of knowledge regarding the technique of performing the procedure. Mammography awareness and use were also lower [32]. Also, another study by (Tehsin et al., 2025) who indicated that Saudi Arabian women know little about the dangers of breast cancer, nor are they likely to have barriers to perception when it comes to mammogram screening [33]. (Ben El-Fakir et al., 2024) indicated the factors for not practicing BSE included a lack of knowledge and feelings of uncomfortableness [15].

(Oglat et al., 2024) found 90.49% (n = 856) of Jordanian students in medical fields with low BSE practice and this demonstrated a weak understanding of BC disease, including its possible risks, methods of detection, diagnosis, treatment, signs and symptoms, as well as knowledge about mammography and other related information [27]. This is consistent with findings from Northcentral Ethiopia, where (Mehiret et al., 2025) reported that 40.70% of students practice a breast-self-examination and the rest did not practice it because of forgetting fullness and lack of knowledge [34]. Also, another study in same year by Baral et al. in India revealed the percentage of students who regularly practiced breast self-examination was remarkably small, with only 1.18% students, and only 9.98% of the respondents had a clinical breast examination. The main source of information was social media, with 69.75%, and the preferred method for awareness raising was educational workshops with 76.2% [29]. As well as, (Sana et al., 2025) In India found there were fewer than half (48.3%) of subjects performed BSE on a monthly basis, while 43.1% had never done it [30].

The findings of (Abdulla et al., 2025) in the United Arab Emirates revealed that the relationship between the attendance of breast cancer awareness programs and the utilization of screening services exist, further, the significant gaps in the use of screening services such as emotional and perceivable barriers were observed. Therefore, it becomes mandatory to remove such obstacles in order to enhance early detection and treatment outcomes [35]. This study contributes to the existing literature by highlighting the need for targeted educational interventions to improve breast cancer awareness among pre-graduating female students.

Strengths

- **Targeting Future Health Promoters:** The pre-graduating female students are an important group to target since they are young and mostly in health-related fields, making them key agents for the dissemination of health awareness in the future.
- **Methodological Validity:** The use of standardized and validated questionnaires helps ensure the reliability and credibility of the data gathered from these studies.
- **Addressing High-Impact Health Issues:** The importance of early detection awareness among young and educated women cannot be overstated, as studies show that there is a high general level of health awareness but a lack of knowledge in specific aspects and skills in conducting a breast self-examination.

Limitations

- **Limitations of Cross-Sectional Design:** Since it is a cross-sectional study, it limits the ability to establish causal relationships between variables.
- **Constraints of Generalizability:** Since it was conducted only among female students, it cannot be generalized to the general female population, considering differences in age, educational background, etc.
- **Need for Further Methodological Approaches:** To address these limitations, further study using prospective methods is suggested to determine the impact of awareness over time.

5-CONCLUSION

The moderate awareness levels observed among female students, coupled with significant deficiencies in key areas of breast cancer detection knowledge, highlight a critical public health concern. There is a statistically significant relationship between students' field of study (Health and Non-Medical) and their awareness level of early breast cancer detection, also There is a significant relationship among awareness of early breast cancer detection and family history of breast cancer, clinical breast examination experience, attending seminars on early detection, and practicing breast self-examination. By comparing these findings with similar studies, it becomes evident that this issue transcends regional boundaries. Therefore, comprehensive and culturally sensitive educational initiatives are imperative to equip young women with the necessary knowledge and practices for early detection of breast cancer. Also, there is a need for multiple public awareness campaigns utilizing mass media platforms like television, the Internet, and radio, along with social media. Additionally, specialized awareness programs should be organized in locations where many women can be easily accessed, such as faculties, universities, and health care centers.

Conflict of Interest: There is no conflict of interest in this study.

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Authors' contributions

All authors contributed to the study conception and design. Data collection, analysis, and interpretation were performed by the authors. All authors read and approved the final manuscript.

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