

# Evaluation of Breast Cancer (BC) Awareness among Female University Students in Zarqa University, Jordan

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## ABSTRACT

**Objective:** The purposes of this study were to assess the level of Breast Cancer (BC) awareness of Jordanian female university students, measure their attitudes toward BC treatment, and compare the level of awareness and attitudes of students in the science and humanities faculties.

**Materials and Methods:** The current study was cross-sectional and conducted among female students in Zarqa University in Jordan. Stratified random sampling and simple random sampling were employed to select the colleges and the students, respectively. The sample size was 326 students. Data was collected and analyzed by self-administered questionnaire and SPSS version 23.0, respectively.

**Results:** The number (proportion) of university students who had poor levels of awareness of BC, general knowledge about BC scale, knowledge about BC symptoms scale, and knowledge about risk factors of BC scale were 270 (83%), 166 (51%), 182 (56%) and 292 (90%), respectively. Also, 92 (28%) students and 234 (72%) students had high and medium attitudes toward BC treatment, respectively. There were significant differences between the humanities and science faculties students' awareness about BC and their attitudes toward BC treatment ( $p < 0.05$ ). Also, the results revealed that the students' main information source about BC was mainly health-care professionals, followed by internet and television.

**Conclusion:** The current status of awareness of BC among Jordanian female students and their attitudes toward BC treatment are insufficient. Therefore, university compulsory courses need to be modified to include BC topics and promote awareness about BC.

**Keywords:** Awareness, breast cancer, knowledge, attitudes

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## Introduction

Breast cancer (BC) is the most frequent malignancy in women worldwide and it accounts for the highest incidence of cancer among female population globally (1). Moreover, the global incidence of BC is escalating, especially among younger women (2, 3). Each year over million women worldwide are diagnosed with BC and more than half million die from the disease (4).

Over the past two decades, BC becoming a key public health concern in developing countries in Asia, the Middle East and Africa due to its high associated mortality, and now it is the second reason of cancer death after lung cancer in more developed countries (5). Even where there is scant data regarding BC in developing countries, such as those in the Arab world, one can predict that the frequency of BC is also very high and rising at fast rate in those countries (6).

In Jordan, the second leading cause of death among both genders after heart disease is cancer and BC is the most frequent cancer among Jordanian females, with an incidence rate of 39.4% (7). Furthermore, approximately 37% of BC cases in Jordan are diagnosed in advanced stages with a median age of incidence of 50 years, and with only 17% of cases being diagnosed before the age of 40 (8).

Breast cancer is defined as a cancer that forms in the tissues of the breast, and it is considered invasive if the BC has spread from where it began to the surrounding tissue (9). BC signs may include dimpling of the skin, a change in breast shape, a lump in the breast, a red scaly patch of skin, or fluid coming from the nipple (10). The main BC's risk factors are encounter ionizing rays, obesity after menopause, exogenous estrogens long-term consumption, first pregnancy after age of twenty five years, null-parity, delayed menopause, early menarche, family history, and age (5, 11). BC can be diagnosed by comprehensive screening by breast self examination, clinical breast examination, and mammography or by a combination of three (12-14).

In developing countries, fighting against cancers, especially BC, is one of the lowest priorities in policy makers list (15). Indeed, developing countries such as Jordan have thus far paid little attention to raising awareness of BC in the female population. However, considering

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that BC becoming a global health-care interest, many researchers have been conducted worldwide to explore female's beliefs and knowledge about BC, and investigate their awareness about BC (1, 5, 15-32). Most of these studies were in developed countries; only Suleiman (1) studied the awareness and attitude toward BC in Jordan, and his results showed that the study sample (Jordan university female students) had an insufficient awareness of BC. Therefore, the current study revisits this issue four years later by investigating awareness of BC among female students at the university.

Lack of knowledge and incorrect beliefs about BC prevention have been found to result in a negative role in the using of early BC screening tests among the female population in Jordan (33). It is important to evaluate the level of Jordanian women awareness about BC risk factors. Hence one of the aims of this study was to assess awareness of BC among female university students in Jordan, focusing on the following research questions: (1) What is level of awareness about BC among female students at the university? (2) What are the attitudes toward BC treatment among female students at the university? (3) Does the level of awareness about BC among female students at the university differ according to their faculty (humanities, science)? (4) Do attitudes toward BC treatment among female students at the university differ according to their faculty (humanities, science)?

It is envisaged that this study will provide valuable feedback for the Jordanian health-care profession to assist them in determining the strengths and gaps in their health education programs. This study also explored sources of student knowledge that could be harnessed to raise awareness about BC. The study focused on third-and fourth-year students in order that the results would be of value to university leaders in enabling them to consider making modifications to faculty syllabuses, and especially compulsory courses. Also, it is hoped that this study will open doors for future researchers wishing to measure BC awareness in other female populations such as schoolchildren, employees, housewives etc.

**Material and Methods**

This study adopted a descriptive cross-sectional design and was carried out from September 2017 to November 2017 at the university. The population of this study was all female students registered at the university in the first semester of the 2017/2018 academic year. The total number of female students was around 2933. This university is composed of 13 faculties for both sexes of undergraduate student: Six humanities faculties, four science faculties, and three health faculties. Written permission was obtained from the university human subject committee for data collection. We obtain informed consent from participant students and they participated in the study in fulfillment with the voluntariness principle.

To ensure unbiased student selection, health faculty students and students who are already suffering from BC or have a family member suffering from BC were excluded from the sampling frame. To study the effect of university programs on BC awareness, only third- and fourth-year female students were recruited for the study. The generalizability of these results was determined by the psychometric characteristics of the research tool such as reliability and validity.

Stratified random sampling was used to select one department from every faculty (science or humanities). Online calculator (<http://www.raosoft.com/samplesize.html>) was used to estimate the minimum effective sample size with 5% error margin, 95% confidence interval. At the level of departments, 20% of female students from every selected department were chosen by simple random sampling; 26, 117, 61,

66, 16, 22, 15, 61, 15 and 20 students were selected from Shari'a, Arts, Economics and Administration Sciences, Educational Sciences, Law, Journalism and Mass Communication, Science, Information Technology, Arts and Design, and Engineering Technology faculties, respectively. The detailed inclusion criteria are defined in Figure 1. The selected sample size was 326 female students; 186 and 140 students were recruited from the humanities and science faculties, respectively, see Table 1, and their age's average was 20.85±1.08 years.

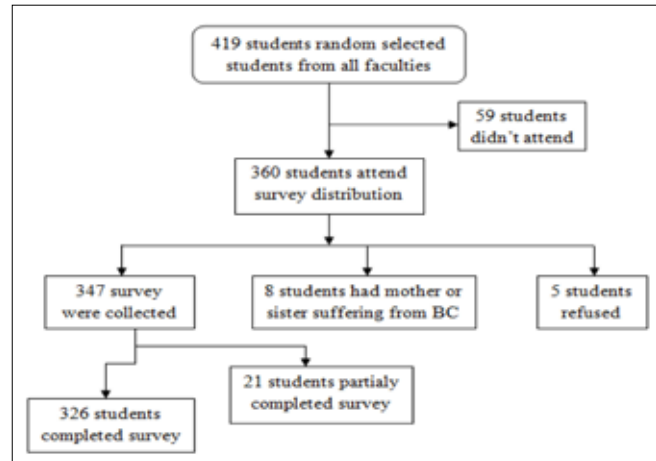


Figure 1. Exclusions of study sample

Table 1. Study Sample

Variable	n	Percentage	
Faculty	Humanities	186	57.06%
	Science	140	42.94%
	Total	326	100%
Level	Third year	175	53.68%
	Fourth year	151	46.32%
	Total	326	100%

The research approach of this study was quantitative and it was conducted by using a self-administered survey. The questionnaire was adapted and developed (by the deletion and adaptation of items and scales) from the literature (5, 15, 18, 20, 22, 23, 25, 26, 28, 29, 31, 32).

The questionnaire consisted of 60 items that were designed to cover five scales: 1) general knowledge about BC (13 items: 1–13); 2) knowledge about BC symptoms (15 items: 14–28); 3) knowledge about risk factors of BC (14 items: 29–42); 4) the main source from which participants gain knowledge about BC (eight items: 43–50); and 5) students' attitudes toward BC treatment (10 items: 51–60). The first three scales represent total awareness (general knowledge about BC, knowledge about BC symptoms, and knowledge about risk factors of BC). For most of the questionnaire items (1–50), the participants were asked to rate their answer using a multiple choice option (Yes or No). Three-point Likert-type scale (agree/neutral/disagree) was used to the last 10 items (51–60). (The questionnaire copy is obtainable from the researcher).

Experts estimated that every “yes” response was scored 1 and every “no” answer was scored 0. Also, every “agree” response was scored 3, every “neutral” was scored 2 and every “disagree” was scored 1. Otherwise, the level of general knowledge about BC, knowledge about BC symptoms, and knowledge about risk factors were assessed by categorizing the respondents into four groups: the “excellent” knowledge group consisted of those who answered 86–100% of the questions correctly, the “very good” knowledge group included those who answered 73–85% correctly, and the “good” knowledge group was comprised of those who answered 60–72% correctly, while the participants who answered less than 60% of the questions correctly were assigned to the “poor” knowledge group.

The study questionnaire was initially created in English, and then it was translated into Arabic and then back-translated into English to ensure that the essential meaning of the questionnaire had been preserved. Then, the questionnaire was reviewed by two faculty members who have experience in survey design and two faculty members from pharmacy faculty. Also, five students from the education faculty and five students from information technology faculty were asked to read the questionnaire items and give their feedback about the clarity. All views were considered to improve the questionnaire. Lastly, the questionnaire was piloted and checked for reliability by administering it to 30 students from outside the study sample, and the Kuder-Richardson formula 20 was used to estimate reliability. The questions had a reading of 0.70, which is suitable value. Further data analysis found that the Cronbach’s alpha coefficients for all the scales of questionnaire ranged from 0.704 to 0.826; greater than the threshold of 0.5 recommended in Nunnally (34).

**Statistical analysis**

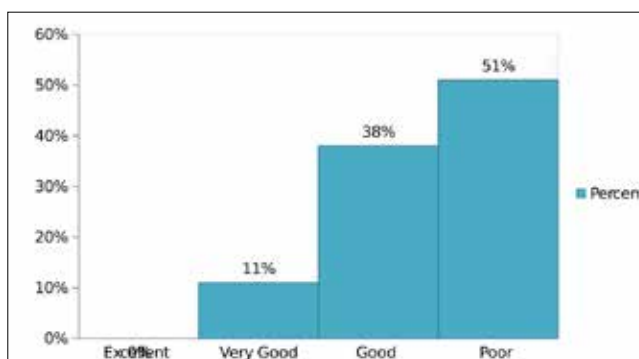
The collected data was analyzed by Statistical Package for the Social Sciences (SPSS) for windows version 23.0 (SPSS IBM Corp; Armonk, NY, USA) and Microsoft Office Excel 2007. Descriptive statistics (percentage, mean and standard deviation) was applied to summarize the students’ responses on survey. Also, independent sample test was used to test whether there were significant differences among the means of the participants’ responses regarding certain survey scales. The data statistical significance was at the level of  $p < 0.05$ .

**Results**

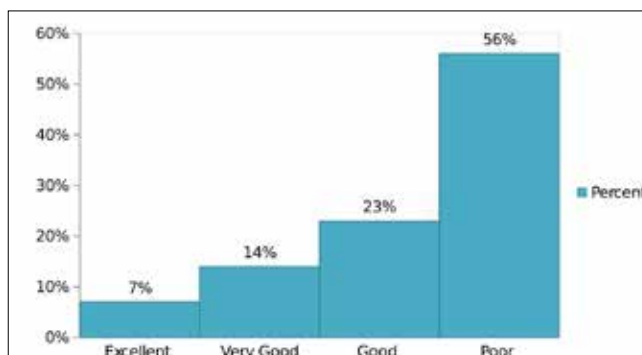
As regards the students’ general knowledge about BC, the results showed that 166 (51%) students had a poor level of general knowledge about BC, 123 (38%) had good knowledge, 36 (11%) had a very good level of knowledge, and 1 (0%) had excellent knowledge. Only one participant was aware of all the 12 items of general knowledge about BC, whereas five (1.5%) were aware of only two items. The level of students’ general knowledge about BC is represented in Figure 2.

The participants were also asked about their knowledge of BC symptoms. The results indicated that 182 (56%) of the students had a poor level of knowledge about BC symptoms, while 76 (23%) had a good level, 44 (14%) had a very good level, and 24 (7%) had an excellent level. Only 12 (4%) participants were aware of all 15 items, while four (1%) participants were aware of the minimum two items of BC symptoms. The level of students’ knowledge about BC symptoms is represented in Figure 3.

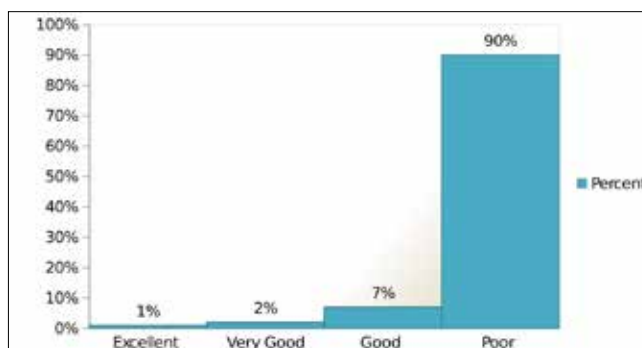
As for the level of students’ knowledge about the risk factors of BC, the results revealed that 292 (90%) students had a poor level of knowledge about BC risk factors, while 22 (7%) had good and 8 (2%) had very good knowledge, and only 4 (1%) had an excellent level of knowledge. However, only 6 (7.5%) of the students were aware of all 10 BC risk factors, whereas 10 (3%) students were not aware of any risk factors. The level of students’ knowledge about BC risk factors is represented in Figure 4.



**Figure 2.** Students’ general knowledge about BC



**Figure 3.** Students’ knowledge about BC symptoms



**Figure 4.** Students’ knowledge about BC risk factors

As regards students’ awareness about BC, the results showed that 270 (83%) students had a poor level of awareness about BC, 40 (12%) had a good level, 14 (4%) had a very good level, and 2 (1%) had an excellent level. No student was aware of all 42 BC symptom items, while 4 (1%) participants were aware minimum two items. The level of students’ awareness about BC symptoms is represented in Figure 5.

Figure 6 shows that the students’ three main sources of information about BC were health-care professionals (77.3%), followed by the internet (73%) and television (72.4%).

The results for students’ attitudes toward BC treatment showed that most of the students (234; 72%) had medium attitudes about the treatment of BC and 92 (28%) had high attitudes about BC treatment. The level of students’ attitudes toward BC treatment is represented in Figure 7.

In this study, independent sample t-test was used to test whether there were significant differences between the means of the participants’ re-

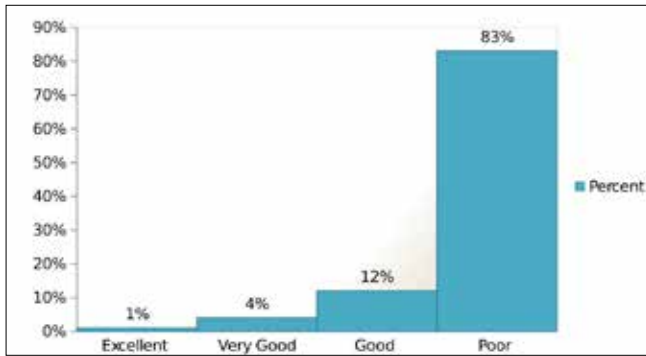


Figure 5. Students' awareness about BC

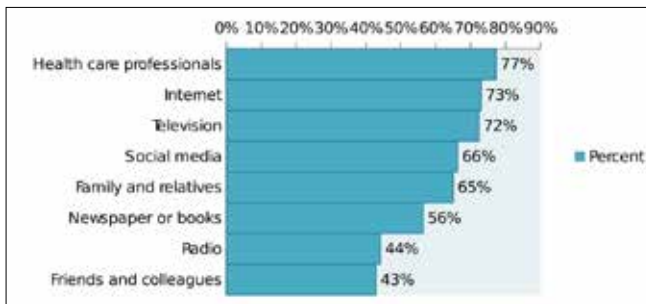


Figure 6. Sources of BC information

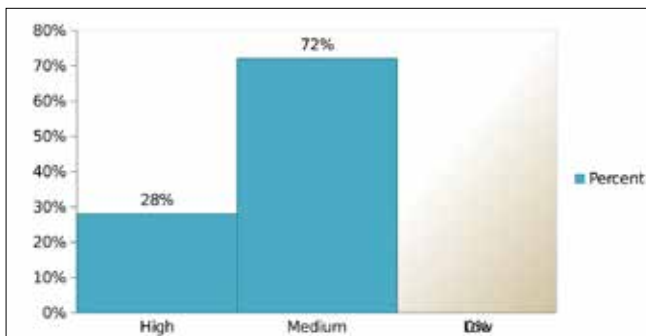


Figure 7. Students' attitudes toward BC treatment

sponses in relation to their general knowledge about BC, knowledge of symptoms of BC, knowledge of risk factors of BC, total awareness of BC, and attitudes toward BC treatment, according to their faculty (humanities or science). The results are shown in Tables 2 and 3.

It can be seen from the tables that humanities faculty students means were significantly, at ( $\alpha=0.05$ ), higher than science faculty students in the following scales: knowledge of symptoms of BC, knowledge of risk factors of BC, students' attitudes toward BC treatment, and total awareness of BC. However, there was no significant difference for the scale, general knowledge about BC.

## Discussions and Conclusion

Female university students will be model for their environment and society in their practices about BC beside their knowledge about BC and early diagnosis of BC. In our study, the female participants' knowledge about BC, BC symptoms, and BC risk factors was insufficient, which means that their total awareness of BC was poor. These results align with those reported by other studies, which also showed poor awareness of BC. For instance, Suleiman (1) conducted a study on female university students aged 18–37 years old in Jordan and found that 51.8% of respondents were aware about BC,

which means that the status of awareness of BC in Jordanian female students was insufficient. Also, Nabi et al. (5) conducted a study on women who attended Medical College Hospital in north India and found that the majority (60%) of the participants had poor knowledge about various BC risk factors and symptoms, while in a study among adult women over the age of 18 in Bahawalpur, Pakistan (25) there was a lack of awareness regarding BC risk factors. Also, Younis et al. (32) investigated the level of knowledge of BC among young adult females in the UAE and revealed that the respondents' knowledge of BC was lower than expected, while in a study among women over 40 years old living in the city of Rio Branco in the western Amazon (31) found that participants had a poor knowledge of BC risk factors and symptoms. Furthermore, a study conducted on Saudi female patients who were 20–70 years of age and attending primary health-care centers in the Qassim region concluded that their level of awareness regarding BC was not adequate (23). A study was also conducted on female teachers working in schools in Al-Jahra, Kuwait to assess their BC knowledge and awareness, the results of which showed insufficient knowledge in female teachers about BC (18). Also, Radi (30) conducted a study on Saudi women aged 20 and older living in Jeddah and the results indicated that Saudi women's level of awareness of BC was very inadequate. Finally, Hadi et al. (22) conducted a study at Universiti Sains Malaysia, Penang, Malaysia and found that students had limited knowledge of the risk factors and signs and symptoms of BC.

There were significant differences between the humanities and science faculties students' awareness about BC and their attitudes toward BC treatment ( $p<0.05$ ). These results may be due to humanities faculty students having more non-study time at university compared to science faculty student; this excess time gives them more opportunities to attend health-care professionals' workshops and seminars, to watch television, and to use the internet to discover more information about BC.

The findings of this study with respect to differences by faculty are similar to those in Abdul Razek and Al-Rashid (17) who studied BC awareness level of female students in King Saud University. However, this study's findings differ from those in Abddlhaq et al. (16), who sought to determine the differences in health awareness according to faculty in An-najah National University and Alquds University. They found that there were significant differences in health awareness among students, but in their study humanities faculty students' health awareness was poorer than that of the science faculty students. However, this difference in the findings could be explained by the demographic profile of their study sample which consisted of first-year students rather than third- and fourth-year students as in this study.

Also, the findings of our study revealed that the students' main information source about BC was mainly health-care professionals, followed by internet and television. These results were differing from Suleiman (1) results in which students obtained their information about BC was from health workers or their friends. This difference may well be due to developments in using the internet and social media in Jordan in recent years.

Overall, the findings of this study are in keeping with previous research in which BC awareness has been found to be low among women in developing countries. This study revealed that BC awareness in all its scales (general knowledge about BC, knowledge about BC symptoms, and knowledge about risk factors of BC) among Jordanian female university students was poor and their knowledge was limited. Also, their attitudes toward BC treatment were medium. This means that university programs are falling short in terms of supporting students to improve their BC awareness. Indeed, primary health-care providers should focus on raising awareness about BC among female students in universities. Therefore this study makes the following recommendations:

Hold workshops and science seminars to discuss how to improve awareness of BC among women, especially university students.

**Table 2.** Level of Student Awareness by Type of Faculty

Scale	Faculty type	n	Mean	Deviation	F	Significance
General knowledge about BC	Humanities	186	7.38	1.94	.101	.133
	Science	140	7.04	2.03		
Knowledge of symptoms of BC	Humanities	186	8.34	2.99	1.346	.012*
	Science	140	7.46	3.31		
Knowledge of risk factors of BC	Humanities	186	5.51	2.80	1.203	.000*
	Science	140	4.29	2.57		
Total (awareness)	Humanities	186	21.62	5.71	.592	.001*

\* Significant at the 0.05 level

**Table 3.** Students' Attitudes toward breast cancer Treatment by Type of Faculty

Scale	Faculty type	n	Mean	Standard Deviation	F	Significance
Students' attitudes toward breast cancer treatment	Humanities	186	23.48	2.14	3.099	.006*
	Science	140	22.77	2.49		

\* Significant at the 0.05 level

Activate a partnership between health-care providers and the media so that the latter can play a role in improving awareness of BC among women.

Conduct further studies on ways to improve BC awareness among women.

Modify university compulsory courses to include BC topics and promote awareness about BC.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the ethics committee of Zarqa University.

**Informed Consent:** Written informed consent was obtained from patients who participated in this study.

**Peer-review:** Externally peer-reviewed.

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**Conflict of Interest:** All authors have no conflicts of interest to declare.

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