



Breast cancer knowledge, attitude and practice among medical and non-medical university students

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Abstract

Aims To assess the level of breast cancer knowledge, attitude and practice among female Beni-Suef University students.

Methods A cross-sectional study was conducted at Beni-Suef University. A convenience sample of 963 female students (489 non-medical and 474 medical) was included. The sample was selected from different colleges with a response rate of 87%.

Results The mean age of non-medical and medical participants was 19.4 years ($SD \pm 1.24$) and 20.74 years ($SD \pm 1.5$), respectively. Medical students were more knowledgeable about breast cancer risk factors. Breast self-examination (BSE) practice was known by 72.4% of medical students vs. 47.6% of non-medical ones. Nearly two-thirds of the medical students performed BSE at the best time during the menstrual cycle. Poor level of knowledge and practice was found among non-medical students compared with a good level of knowledge and practice among medical students ($P = 0.001$). Both groups showed insufficient levels with regard to attitude. Non-medical students showed positive predictors for poor and insufficient knowledge (OR = 469.2 and 62.17, respectively). Having relatives with breast cancer was a significant negative predictor for the state of poor practice (OR = 1.809). Willingness to attend awareness and training seminars was a significant negative predictor for the state of insufficient practice among the non-medical students (OR = 0.624).

Conclusions The level of knowledge and practices toward breast cancer was higher among medical students. The overall level of BSE practice was low, with a significant difference between the medical and non-medical students.

Keywords Knowledge · Attitude · Practice · Female students · Breast cancer

Introduction

Breast cancer ranks first among female non-communicable diseases and is the leading cause of cancer deaths among women, accounting for 23% of the global cancer burden and 14% of all cancer deaths (Jemal et al. 2011). In Egypt, the incidence is 32%, with an age-specific incidence rate of 48.8 per 100,000 population. The median age at diagnosis is 1 decade younger than in European countries, and most patients are pre-menopausal (Ibrahim et al. 2014).

In Arab countries, breast cancer occurs most frequently at a younger age with locally advanced disease at

presentation, whereby surgical management (mastectomy) is the most commonly adopted treatment option (El Saghir et al. 2007). Risk factors for breast cancer include increasing age and familial and reproductive factors in addition to sedentary lifestyle, high body mass index and use of hormone replacement therapy (Stuckey 2011). Breast cancer screening and early detection practices are affected by level of knowledge. A low level of breast cancer awareness is associated with poor screening practices (Okobia et al. 2006; Haji-Mahmoodi et al. 2002). Breast self-examination (BSE) (Thomas et al. 2002), as recommended by the American Cancer Society, promotes the early detection of breast cancer and assists women with becoming familiar with the appearance and feel of their breasts, helping them detect any changes as early as possible (American Cancer Society 2017–2018). Recent studies suggest that women's knowledge about risk perception factors is limited (McMenamin et al. 2005; Pöhls et al. 2004). This study aims to assess the level of knowledge, attitude and practice related to breast cancer among female students at Beni-Suef University.

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Methods

Study design and setting A cross-sectional study was conducted in Beni-Suef University from February to May 2017.

Sampling technique and size The study population included all female medical and non-medical students at Beni-Suef University. A convenience sample of 963 female students (489 non-medical and 474 medical) was included in this study. The sample was selected from different colleges with a response rate of 87%.

Study tool

A self-administered questionnaire was distributed by the researchers to assess general knowledge about attitude toward and practices regarding early warning signs and risk factors of breast cancer among female students. Part 1 of the questionnaire covered socio-demographic data such as age, marital status, residence and academic year, while Part 2 assessed general knowledge about and awareness of risk factors for breast cancer. The total knowledge score (Q1 to Q38) ranged from 0–44 and was evaluated by calculating the total number of correct answers and the mean and then comparing them using a t-test. Each correct answer was given one (1) point, while incorrect and “do not know” responses received zero (0) points. A poor knowledge score ranged from 0 to 14.7 and was given 0%–33.3% of the total percentage; the moderate knowledge score ranged from 14.8–29.4 (33.4%–66.7% of the total score), and a score of ≥ 29.5 ($\geq 66.8\%$ of the total score) was considered good or optimal knowledge.

Part 3 of the study investigated the attitude of students toward seeking medical advice (Q39–Q45). Each correct answer was given one (1) point, and incorrect and “do not know” responses were given zero (0) points. The total score ranged from 0 to 6. Participants with scores of 0–2 were considered to have a poor attitude, those with 3–4 points a moderate attitude and > 4 points indicated an optimal score.

Part 4 assessed the students’ practice of BSE (Q46–Q53). Each correct answer was received one (1) point, while incorrect and “do not know” responses were given zero (0) points. The total score ranged from 0 to 4. Participants with scores of 0–1.33 were considered to have poor practice, those with 1.34–2.66 had moderate practice, and those with > 2.67 points had optimal practice.

The questionnaire was pre-tested by conducting a pilot study on 20 students to check the clarity of the questions. Content validity was assessed by reviewing the literature. The reliability of the questionnaire was tested by calculating Cronbach’s alpha for the three knowledge, attitude and practice scores, which were 0.867, 0.605 and 0.707, respectively ($P < 0.001$).

Statistical analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS version 22). Frequency distributions were employed to describe the data. For the categorical data, the Pearson’s chi-squared test was used to examine the association between variables and t-test to find the group means and standard deviations. $P < 0.05$ was considered significant.

Results

Demographic characteristics

The mean age of non-medical and medical participants was 19.4 years ($SD \pm 1.24$) and 20.74 years ($SD \pm 1.5$), respectively. Urban-residing medical students constituted 60.3% and 39.7% had rural residency, while 61.8% of non-medical students had rural residency compared with 38.2% urban residents.

Basic knowledge about breast cancer

The second part of the questionnaire was designed to assess basic knowledge about breast cancer with a higher percentage in favor of medical compared with non-medical students; 70.3% vs. 57.9% knew that breast cancer can affect females < 30 years, while 87.3% vs. 52.9% were aware that breast cancer is non-contagious, and 81.9% vs. 57.1% reported that not all breast lumps are malignant. Both groups showed high percentages ($> 90\%$) of awareness that early detection of breast cancer gives better results and might improve the survival rate, and $> 80\%$ of female students confirmed awareness of doing monthly BSE starting from 20 years of age.

Knowledge about breast cancer risk factors

Medical students were more knowledgeable about 11 risk factors for breast cancer, while non-medical ones were more knowledgeable about only two risk factors for breast cancer (Tables 1, 2, and 3).

Breast cancer symptoms

Medical students had more correct answers with a statistically significant difference ($P = 0.001$).

Breast cancer diagnosis and treatment

Medical students had more correct answers than their counterparts (81.5% vs. 66.6%) about BSE being the best method for early detection.

Table 1 Knowledge about risk factors for breast cancer among medical and non-medical students

Items	Non-medical students n = 489 (%)	Medical students n = 474 (%)	P value
1 Family history of breast cancer	154 (31.5)	270 (57)	0.001*
2 Hormone replacement therapy after menopause	119 (24.3)	269 (56.8)	0.001*
3 Eating fatty foods	116 (23.7)	197 (41.6)	0.001*
4 Stressful life	201 (41.1)	196 (41.4)	0.938
5 Lack of regular physical activity	139 (28.4)	225 (47.5)	0.001*
6 Obesity and overweight	201 (41.1)	308 (65)	0.001*
7 Tobacco smoking	278 (56.9)	368 (77.6)	0.001*
8 Exposure to ionizing radiation	267 (56.4)	421 (88.8)	0.001*
9 Depression	175 (35.8)	136 (28.7)	0.019*
10 Not breast feeding	92 (18.8)	231 (48.7)	0.001*
11 Breast cancer is more common in women with large/dense breasts	124 (25.4)	141 (29.7)	0.127
12 Wearing tight bra	109 (22.3)	108 (22.8)	0.854
13 Breast implants	81 (16.6)	42 (8.9)	0.001*
14 Having children after the age of 30	121 (24.7)	177 (37.3)	0.001*
15 Using oral contraceptive pills	200 (49.1)	263 (55.5)	0.001*
16 Early menarche and late menopause	103 (21.1)	162 (34.2)	0.001*

*Statistical significance ($P < 0.05$)

Table 2 Practice of breast self-examination among participants

Items	Non-medical students n = 489 (%)	Medical students n = 474 (%)	P values
Have you heard about BSE before?	233 (47.6)	343 (72.4)	0.001*
If you heard about BSE before, what was the source?			
Mass media	100 (42.9)	128 (37.3)	0.052
Posters/brochures in the street or university	46 (19.7)	80 (23.3)	
Friends	43 (18.5)	58 (16.9)	
Relatives	44 (18.9)	69 (20.1)	
More than one source	0 (0)	8 (3.3)	
Have you ever performed BSE?	82 (16.8)	145 (30.1)	0.001*
If you performed BSE before, did you find masses?	9/82 (11.0)	15/145 (10.3)	0.329
Do you perform BSE at the best time, namely 3–5 days after end of menses	31/82 (37.8)	98/145 (67.6)	0.001*
Total participants not performing BSE	407 (83.2)	329 (69.4)	
Reason			
BSE is not important	25 (6)	26 (7.9)	0.001*
I forget to do it	44 (11)	55 (16.7)	
I do not know how to do it	204 (50)	179 (54.4)	
I am afraid of doing it (may find masses)	47 (11.6)	18 (5.5)	
More than one cause	87 (21.4)	51 (15.5)	
Is BSE important in your opinion?			
Yes	366 (74.8)	375 (79.1)	
No	0 (0)	6 (1.3)	
Do not know	123 (25.2)	93 (19.6)	
Total BSEs performed	82 (16.8)	145 (30.1)	
No. of correct BSE	63/82 (76.8)	118/145 (81.3)	0.413

*Statistical significance $P < 0.05$; BSE = breast self-examination

Table 3 Breast cancer knowledge, attitude and practices score among participants

Score	Groups		P value
	Non-medical students	Medical students	
Knowledge score			
Poor	164 (33.5)	18 (4.2)	0.001*
Insufficient	322 (65.9)	297 (62.7)	
Good	3 (0.6)	157 (33.1)	
Attitude score			
Poor	118 (24.1)	106 (22.4)	0.513
Insufficient	331 (67.7)	336 (70.9)	
Good	40 (8.2)	32 (6.7)	
Practice score			
Poor	264 (54)	204 (43)	0.001*
Insufficient	90 (18.4)	62 (13.1)	
Good	135 (27.6)	208 (43.9)	

*Statistical significance $P < 0.05$

Concerning BSE 3–5 days after the end of menses (25.1% vs. 12.9%), methods of diagnosis were known by 15.2% vs. 4.3% (> 3 methods) and 15% vs. 0% (> 4 methods), and 18.1% vs. 3.7% knew about four treatment methods.

Table 4 Multinomial regression model for knowledge categories

Knowledge category	B	SE	Wald	P value	OR	95% confidence interval for OR	
						Lower bound	Upper bound
Poor							
Group (non-medical)	6.15	0.65	88.9	0.001*	469.2	130.7	1684.9
Residence (urban)	0.93	0.30	9.5	0.002*	0.39	0.22	0.71
Marital status (unmarried)	0.72	0.76	0.9	0.347	0.49	0.11	2.2
Willing to attend BSE training	0.14	0.29	0.2	0.636	0.87	0.496	1.54
Relative(s) with breast cancer	0.74	0.49	2.3	0.132	0.48	0.18	1.25
Someone you know has breast cancer	0.47	0.42	1.3	0.261	0.62	0.28	1.42
Have you ever attended a breast cancer awareness seminar?	1.66	0.86	3.7	0.055	0.19	0.04	1.03
Insufficient							
Group (non-medical)	4.13	0.59	47.5	0.001*	62.17	19.21	201.3
Residence (urban)	0.66	0.21	9.8	0.002*	1.94	1.28	2.93
Marital status (unmarried)	1.21	0.61	3.9	0.048*	0.29	0.09	0.99
Willing to attend BSE training	0.06	0.22	0.09	0.771	1.07	0.69	1.63
Relative(s) with breast cancer	0.62	0.29	4.39	0.036*	0.54	0.3	0.96
Someone you know has breast cancer	0.62	0.27	5.4	0.020*	0.54	0.32	0.91
Have you ever attended a breast cancer awareness seminar?	0.76	0.35	4.73	0.030*	0.47	0.24	0.93

The reference category is good

*P value is significant at < 0.05 ; BSE = breast self-examination; B = unstandardized beta;

SE = standard error; OR = odds ratio

Breast self-examination (BSE)

Regular visits to a specialist was well known by medical students, especially if a breast lump was found or the subject had a positive family history ($P = 0.001$).

Regarding BSE practice, 72.4% of medical students had heard about BSE vs. 47.6% of their counterparts ($P = 0.001$), and 30.1% of the former performed BSE compared with 16.8% of the latter ($P = 0.001$) (Table 2).

Levels of different scores of knowledge, attitude and practice regarding breast cancer

A poor level of knowledge and practice was found among non-medical students compared with a good level of knowledge and practice among medical students ($P = 0.001$). Both groups showed insufficient levels with regard to attitude (Table 3).

Multinomial regression analysis of knowledge score levels

Non-medical students showed positive predictors for poor and insufficient knowledge ($P = 0.001/0.001$ and $OR = 469.2/$

Table 5 Multinomial regression model for attitude categories

Attitude categories	B	SE	Wald	P value	OR	95% confidence interval for OR	
						Lower bound	Upper bound
Poor							
Group (non-medical)	-0.18	0.29	0.41	0.522	0.83	0.47	1.47
Residence (urban)	-0.21	0.29	0.53	0.467	0.81	0.46	1.43
Marital status (unmarried)	1.29	1.08	1.4	0.231	3.62	0.44	29.84
Willing to attend BSE training	-0.05	0.31	0.02	0.877	0.95	0.53	1.73
Relative(s) with breast cancer	-1.28	0.45	8.22	0.004*	0.28	0.12	0.67
Someone you know has breast cancer	0.25	0.42	0.35	0.557	1.28	0.56	2.93
Have you ever attended a breast cancer awareness seminar?	1.91	1.07	3.2	0.074	6.73	0.83	54.48
Insufficient							
Group (non-medical)	-0.23	0.27	0.76	0.382	0.79	0.47	1.33
Residence (urban)	0.26	0.26	0.94	0.333	1.29	0.77	2.17
Marital status (unmarried)	0.91	1.04	0.76	0.384	2.48	0.32	19.1
Willing to attend BSE training	-0.13	0.28	0.21	0.651	0.88	0.51	1.52
Relative(s) with breast cancer	-0.79	0.37	4.5	0.033*	0.45	0.22	0.94
Someone you know has breast cancer	-0.06	0.39	0.02	0.884	0.95	0.44	2.02
Have you ever attended a breast cancer awareness seminar?	1.52	1.04	2.1	0.144	4.57	0.595	35

The reference category is good

*P value is significant at < 0.05; BSE = breast self-examination; B = unstandardized beta

SE = standard error; OR = odds ratio

62.17, respectively) and residence in an urban area, with a negative predictor for poor knowledge ($P = 0.002$ and $OR = 0.39$) and a positive predictor for insufficient knowledge ($P = 0.002$ and $OR = 1.94$) (Table 4).

Multinomial regression analysis of attitude score levels

The only predictor for the poor and insufficient attitude scores was having a relative with breast cancer ($OR = 0.12/0.22$, respectively) (Table 5).

Multinomial regression analysis of practice score levels

Non-medical students showed positive predictors for poor and insufficient practice ($P = 0.001/0.001$ and $OR = 469.2/62.17$, respectively), and marital status (unmarried) was a significant negative predictor for the state of poor practice ($OR = 0.355$). Having relatives with breast cancer was also a significant negative predictor for the state of poor practice ($OR = 1.809$) (Table 6).

Discussion

The present study revealed that 57% of medical and 31.5% of non-medical students were knowledgeable about family history being a risk for breast cancer. This finding is higher than the 31% and 17% reported among their counterparts in a similar study from Pakistan (Noreen et al. 2015) and in agreement with the reported 55% and 46% among medical and non-medical students in Angola (Sambanje and Mafuvadze 2012).

Post-menopausal hormone replacement therapy was known as a risk factor by 56.8% and 24.3%, respectively, of medical and non-medical students, a finding which is in agreement with the reported 61% and 16% among medical and non-medical students in Pakistan (Noreen et al. 2015).

Smoking was a well-known risk factor among 77.6% (medical) and 56.9% (non-medical) of the two study groups, a finding which is considerably lower than the 100% vs. 81.9% reported in a similar Turkish study (Kurtuncu et al. 2014).

Obesity as another risk factor was known by 65% and 41.1% of medical and non-medical students, respectively, similar to the reported 77.9% vs. 39.0% in the Turkish study (Kurtuncu et al. 2014).

Table 6 Multinomial regression model for practice categories

Practice category	B	SE	Wald	P value	OR	95% confidence interval for OR	
						Lower bound	Upper bound
Poor							
Group (non-medical)	0.72	0.16	21.9	0.001*	2.064	1.524	2.795
Residence (urban)	0.26	0.15	2.8	0.095	1.292	0.957	1.744
Marital status (unmarried)	1.04	0.42	6.1	0.014*	0.355	0.155	0.810
Willing to attend BSE training	0.05	0.16	0.1	0.773	1.047	0.766	1.432
Relative(s) with breast cancer	0.59	0.27	4.9	0.027*	1.809	1.071	3.055
Someone you know has cancer breast	0.35	0.23	2.4	0.118	0.702	0.450	1.094
Have you ever attended a breast cancer awareness symposium?	0.41	0.34	1.4	0.229	0.661	0.337	1.297
Insufficient							
Group (non-medical)	0.94	0.21	19.5	0.001*	2.562	1.688	3.889
Residence (urban)	0.42	0.21	3.9	0.047*	1.516	1.006	2.283
Marital status (unmarried)	0.91	0.58	2.4	0.119	0.404	0.129	1.263
Willing to attend BSE training	0.47	0.21	5.2	0.023*	0.624	0.415	0.938
Relative(s) with breast cancer	0.53	0.34	2.4	0.120	1.706	0.869	3.347
Someone you know has cancer breast	0.11	0.30	0.12	0.725	0.899	0.497	1.625
Have you ever attended a breast cancer awareness symposium?	0.15	0.41	0.13	0.717	1.162	0.516	2.615

The reference category is good

*P value is significant at < 0.05; BSE = breast self-examination; B = unstandardized beta

SE = standard error; OR = odds ratio

In the present study, 41.6% of medical students believed that excessive consumption of fatty food leads to breast cancer development compared with 23.7% among non-medical students. On the other hand, a study conducted in Pakistan reported 13% vs. 12% among medical and non-medical students, respectively (Noreen et al. 2015).

Oral contraceptive pills as a risk factor was reported by 55.5% and 49.1% of medical and non-medical students, respectively. This finding was higher than the 38% and 25% for the same study groups in Angola (Sambanje and Mafuvadze 2012) and similar (68%) to the medical group of students, but much higher than the 4% reported for the non-medical cohort in a Pakistani study (Noreen et al. 2015).

This study showed that 72.4% of medical students and 47.6% of non-medical students had heard of BSE, a finding which is lower than that reported by a Saudi Arabian study conducted in Qassim University, which revealed that 95.8% of medical students had heard of BSE compared with 93.3% of non-medical students (Ibnawadh et al. 2017). Our findings are similar to those reported by Yemeni university students where 76.9% reported hearing about BSE (Ahmed 2010) and higher than the numbers reported by Gulf Medical University students in Ajman where 53.8% reported hearing about BSE (Al-Sharbatti et al. 2012).

BSE as a screening practice was known by 30.1% of the medical and 16.8% of the non-medical students. Higher numbers were reported in a similar study carried out among students at Qassim University, Saudi Arabia, namely 49.7% for medical and 35.7% for non-medical students and nearly similar percentages of 28.4% among medical university students and a higher 30.1% for their non-medical counterparts at Majmaah University, Saudi Arabia (Mohamed et al. 2016).

BSE practice was performed by 67.6% of medical students and 37.8% of non-medical students at the most appropriate time during the menstrual cycle. These findings were higher than those reported in a similar study from Saudi Arabia, where only 17% of female medical students reported performing monthly BSE compared with 39% who never performed it (Nemenqani et al. 2014).

The most common reason for not practicing BSE among participants was that they did not know how to perform BSE, which was reported by 52.2% and 49.1% of medical and non-students participants, respectively. This finding is lower than the 98.5% reported in a similar study of Turkish high school students who did not know how to perform BSE (Karayur et al. 2008), but similar to the 55.9% reported among Yemeni non-medical students (Ahmed 2010), and much higher than the 13% reported

among female university students (15% were medical students) in Nigeria (Iheanacho et al. 2013), reflecting the need to increase our participants' knowledge about how to perform BSE.

The level of breast cancer knowledge and practices was higher among the medical students than non-medical students. This finding was expected since medical students learn about breast cancer in their university curriculum and was consistent with a similar study conducted among female students at Majmaah University in Saudi Arabia (Mohamed et al. 2016), but contrasts with other studies reporting a widespread lack of knowledge about breast cancer among both medical and non-medical university students (Noreen et al. 2015; Sambanje and Mafuvadze 2012; Ahmed 2010; Sait et al. 2010; Yadav and Jaroli 2010; Kurtuncu et al. 2014).

Multinomial regression of knowledge categories revealed that non-medical students showed positive predictors for poor and insufficient knowledge ($P = 0.001/0.001$ and $OR = 469.2/62.17$, respectively) and that residence in an urban area was a negative predictor for poor knowledge ($P = 0.002$ and $OR = 0.39$) and a positive predictor for insufficient knowledge ($P = 0.002$ and $OR = 1.94$). Being unmarried, having a relative with breast cancer, knowing someone with breast cancer and having training about BSE were significant negative predictors for having insufficient knowledge among the study participants ($OR = 0.29, 0.54, 0.54, 0.47$, respectively) (Table 4).

Similar international studies have confirmed by logistic regression analysis that marital status and knowing someone with breast cancer might affect the level of knowledge (Latif 2014; Al-Dubai et al. 2011). In addition, similar studies from Saudi Arabia have identified a significant association between certain demographic characteristics and knowledge regarding breast cancer (Milaat 2000; Alam 2006).

Multinomial regression of practice score levels revealed that non-medical students had positive predictors for poor and insufficient practice ($P = 0.001/0.001$ and $OR = 2.064/2.562$, respectively) and that marital status (unmarried) was a significant negative predictor for poor practice ($OR = 0.355$). Having a relative with breast cancer was also a significant negative predictor for poor practice ($OR = 1.809$), while the willingness to attend awareness and training seminars was a significant negative predictor for the state of insufficient practice among the non-medical students ($OR = 0.624$) (Table 6). Contrary to the current study findings, a similar study showed no significant relation between breast cancer and socio-demographic variables by multivariable logistic regression (Birhane et al. 2017).

Limitations

The present study is a cross-sectional study including female university students in one of Upper Egypt's governmental universities and as such does not represent the Egyptian

female youth population as a whole. In addition, results of the current study need to be augmented to incorporate other bigger national universities in order to represent the entire population of Egyptian female university students. Although female university students represent a sector of young adults in general, BSE knowledge, attitude and practice may be different in other sectors of the female youth population.

Conclusion

The level of knowledge and practices toward breast cancer was higher among female medical students in Beni-Suef University ($P = 0.001$). The level of practicing BSE among female university students in general was low, but with a significant difference between the medical and non-medical students ($P = 0.001$). Our study highlights the importance of increasing awareness and establishment of continuous educational symposia about breast cancer for premarital female students.

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Contributors The authors contributed substantially to conceiving the study, analysis and interpretation of data, and drafting and critical revision of the article. Both authors gave their final approval for the article as submitted.

Compliance with ethical standards

Ethical considerations The Faculty of Medicine, Beni-Suef University Research Ethics Committee, approved the study protocol. The purpose of the study was explained to all participants, confidentiality was assured, and informed consent obtained. The survey tool was anonymous.

Conflict of interest The authors declare that they have no conflict of interest.

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