

Knowledge, attitudes and practices related to breast cancer self-examination among medical students at the University of Khartoum, Sudan

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Background. Breast cancer (BC) is the most common invasive cancer in women, and the second leading cause of death in women worldwide. In Sudan, BC was the most predominant type of cancer among females according to the records of the Radiation Isotope Center Khartoum and Gezira Institute for Cancer Treatment and Molecular Biology.

Objective. To assess the knowledge, attitudes and practice of Sudanese medical students regarding breast self-examination (BSE).

Methods. A descriptive cross-sectional study was conducted during June - August 2019 among university medical students in Sudan. Data were collected using a self-administered, semi-structured and pre-tested questionnaire. The questionnaire comprised five parts: participants' sociodemographic characteristics; knowledge of BSE; knowledge of symptoms of BC; attitudes toward BSE; and attitudes towards BSE practice. Data were analysed using descriptive statistics.

Results. Three hundred questionnaires were distributed among female students, with 295 responses (98.3%). The findings revealed that 285 (96.6%) of the respondents had heard about BSE before, and 293 (99.3%) of them were aware of the monthly BSE test, and agreed that BSE is a good practice test for early BC detection. Two hundred and ninety-one (91.2%) were knowledgeable about BC symptoms. In addition, 191 (64.7%) of the respondents agreed that they could detect BC by themselves, while 277 (76.9%) of respondents said that BSE is not time-consuming. A total of 257 (87.1%) of the respondents agreed that BSE was important and useful in the early detection of abnormalities. For the practice score, three-quarters ($n=221$; 74.9%) of the respondents practise BSE because they are aware of its benefit.

Conclusion. The intensive awareness campaign of BSE practice and BC should be done on a regular basis using mass media to increase the level of awareness of BC.

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Breast cancer (BC) is a global health issue and a leading cause of death among women.^[1-3] It has been estimated that 627 000 women worldwide died from BC in 2018, ~15% of all cancer deaths among women.^[4] In Sudan, BC was the most predominant type of cancer among females according to the records of the Radiation Isotope Center Khartoum and Gezira Institute for Cancer Treatment and Molecular Biology. Most reported cases were young women; ~40% of them were <45 years old and presented with late-stage diagnosis.^[5,6] Globally, the survival rate was reported as ≥80% in North America, Sweden and Japan, to ~60% in middle-income countries and <40% in low-income countries.^[7] Delays in accessing cancer care are common with late-stage presentation, particularly in lower-income and vulnerable populations, in addition to the lack of adequate diagnosis and treatment facilities.^[4]

Early diagnosis of BC provides different choices of treatment, increases survival rate and improves prognosis.^[8,9] Mortality due to BC can be decreased using different measures; this includes

increasing the awareness of early signs and symptoms of BC among females and using simple screening tests that can help to identify individuals with cancer even before symptoms appear.^[10] Breast self-examination (BSE), clinical breast examination (CBE) and mammography are recommended screening methods for BC.^[11] Although mammography has been proven to be the most efficient screening method for BC, it is not practicable routinely in developing countries because it is very costly.^[12,13]

However, BSE is recommended in developing countries because it is a simple, inexpensive and effective non-invasive procedure and requires no special apparatus or hospitalisation.^[14,15] BSE allows women to examine their breast tissue for any abnormal changes, and it can be performed by women at home. BSE helps women to become familiar with the normal feeling and appearance of their breasts, and to detect any changes in their breasts as early as possible.^[16] Although BSE is a simple, quick and cost-free procedure and is recommended in developing countries such as Sudan, many women neglect it either

owing to lack of knowledge or carelessness. The aim of this study was to evaluate the knowledge, attitude and practice of BSE among female medical students of the University of Khartoum, in order to provide data that may be helpful in designing interventions aimed at increasing awareness of BSE as a screening method for the early detection of BC.

Methods

Study design and study population

This cross-sectional study was conducted among female medical students at the University of Khartoum, Sudan, from June to August 2019. The study populations include Bachelor's (BSc) and Master's (MSc) female students from the Faculty of Medicine, Faculty of Pharmacy, Faculty of Dentistry, Faculty of Medical Laboratory Sciences and Faculty of Veterinary Medicine. The study was conducted to assess the level of awareness about BC and BSE among female medical students at the University of Khartoum.

A total of 300 female students were enrolled in this study using a convenient sample size. Three hundred questionnaires were distributed among the study population, and 295 females agreed to participate and complete the questionnaires.

Data collection

Participants were selected by simple random sampling. Participation was voluntary, and written consent was obtained from all students who agreed to participate. Participants received an information sheet and a full explanation of the purpose of the study.

Data were collected using a self-administered semi-structured questionnaire. The questionnaire was constructed from previous studies conducted in Sudan,^[12] India^[17] and Nigeria,^[18] and it was pre-tested using 30 students selected from the Faculty of Medicine to ensure its clarity and reliability before the final study. Printed copies of the questionnaire were handed to the respondents in person. To ensure confidentiality, no names were collected, and codes were used to identify the respondents. The questionnaire comprised five parts: participants' sociodemographic characteristics; knowledge of BSE; knowledge of symptoms of BC; attitudes toward BSE; and attitudes toward BSE practice. Data collection took place between June and August 2019.

Data analysis

After data collection, data were organised, coded and tabulated using SPSS version 25 (IBM Corp., USA) and Excel (Microsoft, USA). The statistical analyses included descriptive statistics.

Ethical approval

The study was approved by the ethical committee of the University of Khartoum, Faculty of Medical Laboratory Sciences, Sudan (no ref. no. available).

Results

Demographic characteristics

A total of 300 questionnaires were distributed among female students from the University of Khartoum, with a response rate of 98.3%. Demographic characteristics are presented in Table 1. The majority

Table 1. Sociodemographic characteristics in breast cancer self-examination respondents (N=295)

Variable	n (%)*
Age, mean (SD), range (years)	22.78 (3.52), 18 - 38
15 - 20	79 (26.8)
21 - 25	163 (55.3)
26 - 30	41 (13.9)
31 - 35	9 (3.1)
36 - 40	3 (1)
Marital status	
Single	242 (82.0)
Married	48 (16.3)
Divorced	5 (1.7)
Residence	
Rural	28 (9.5)
Urban	267 (90.5)
Job status	
Employed	52 (17.6)
Unemployed	243 (82.4)
Living area	
Dormitory	49 (16.6)
Family	246 (83.4)
Faculty	
Pharmacy	27 (9.2)
Medicine	93 (31.5)
Dentistry	75 (25.4)
Medical Laboratory Sciences	78 (26.4)
Veterinary Medicine	22 (7.5)
Health insurance	
Yes	149 (50.5)
No	146 (49.5)
Study level	
BSc	221 (74.9)
MSc	74 (25.1)

*Unless otherwise indicated.

of students (n=242; 82.0%) were single, and most (n=243; 82.4%) were unemployed. Of the total, 27 (9.2%) participants were from the Faculty of Pharmacy, 93 (31.5%) were from the Faculty of Medicine, 75 (25.4%) were from the Faculty of Dentistry, 78 (26.4%) were from the Faculty of Medical Laboratory Sciences and 22 (7.5%) were from the Faculty of Veterinary Medicine. A total of 246 (83.4) students lived with their families, while 49 (16.6) lived in a dormitory. Of all 295 respondents, only 149 (50.5%) did not have social health insurance.

Knowledge of BSE

A total of 96.6% of the respondents had heard about BSE before (Table 2), while 99.3% were aware that BSE should be performed monthly, and agreed that BSE is good practice for early BC detection. Overall, 63.7% of the respondents knew that the area between breast and collarbone must be examined in addition to breast and armpit while performing BSE. Furthermore, more than half (62.4%) of respondents knew how often BSE must be performed.

The main source of information on BSE was found to be the internet 163 (55.3%), followed by television 78 (26.4%), ongoing

Table 2. Knowledge of breast cancer self-examination (BSE) among respondents (N=295)

Knowledge	n (%)
Have you heard of BSE?	
Yes	285 (96.6)
No	10 (3.4)
Is it necessary to perform BSE?	
Yes	293 (99.3)
No	2 (0.7)
Is BSE a practice to detect breast cancer early?	
Yes	293 (99.3)
No	2 (0.7)
Examine breast when performing BSE?	
Yes	290 (98.3)
No	5 (1.7)
Examine armpit when performing BSE?	
Yes	256 (86.8)
No	39 (13.2)
Examine between breast and collarbone when performing BSE?	
Yes	188 (63.7)
No	107 (36.3)
How often must you perform BSE?	
Weekly	11 (3.7)
Monthly	184 (62.4)
Yearly	46 (15.6)
Any time	17 (5.8)
Don't know	37 (12.5)
When is the right time to perform BSE?	
Before menstruation	17 (5.8)
During menstruation	55 (18.6)
After menstruation	130 (44.1)
Any time	20 (6.8)
Posture for BSE: standing?	
Yes	268 (90.8)
No	27 (9.2)
Posture for BSE: lying down?	
Yes	155 (52.5)
No	140 (47.5)
Posture for BSE: sitting?	
Yes	120 (40.7)
No	175 (59.3)
Is a mirror required for BSE?	
Yes	260 (88.1)
No	37 (11.9)
Part of the hand used	
Finger	155 (52.5)
Middle part of the fingers	80 (27.1)
Palm	26 (8.8)
Don't know	34 (11.5)
In one step of BSE, should the arms be raised?	
Yes	255 (86.4)
No	40 (13.0)
The direction of hand movement during BSE	
Random	25 (8.5)
Clockwise	177 (60.0)
Don't know	93 (31.5)

Continued...

Table 2. (continued) Knowledge of breast cancer self-examination (BSE) among respondents (N=295)

Knowledge	n (%)
The pressure applied in BSE is?	
Constant	60 (20.3)
Varied	45 (15.3)
Constant and varying degrees	95 (32.2)
Don't know	95 (32.2)
Is it important to make a note to report the finding during BSE monthly?	
Yes	263 (89.2)
No	32 (10.8)
Is breast cancer preventable?	
Yes	172 (58.3)
No	123 (41.7)
Don't know	73 (24.7)
Your source of information about BSE	
Television	78 (26.4)
Friends	65 (22.0)
Physicians	72 (24.4)
Family	24 (8.1)
Teacher	24 (8.1)
Nurse	24 (8.1)
Radio	14 (4.7)
Magazine	12 (4.1)
Newspaper	12 (4.1)
Internet	163 (55.3)
Pamphlets	20 (6.8)
Primary healthcare centre	24 (8.1)
Ongoing lecture	78 (26.4)

lectures ($n=78$; 26.4%), physicians ($n=72$; 24.4%) and friends ($n=65$; 22%). The other indicators are summarised in Table 2.

Knowledge of BC symptoms

Regarding knowledge about BC symptoms, the majority ($n=279$; 94.6%) of respondents knew that nipple discharge, lumps ($n=271$; 91.9%), change in breast symmetry ($n=270$; 91.5%) and size ($n=266$; 90.2%) can be symptoms of BC (Table 3).

Attitudes towards BSE

A total of 191 (64.7%) of respondents agreed that they could detect BC by themselves (Table 4). A majority ($n=277$; 76.9%) said that BSE was not time-consuming. A majority (87.1%) of the respondents agreed that BSE was important and useful in the early detection of abnormalities. A majority (81.4%) of the respondents disagreed that if there was no family history of BC, there was no need to practise BSE. Approximately 8 out of 10 (79.0%) of respondents immediately considered a lump as a possible indicator if found during BSE, while 19.1% would wait for some time before reporting it. Almost all (95.9%) respondents said that BSE is a good practice, and all women should be taught to do it. A majority (87.8%) of respondents said that they would perform BSE in the future (Table 4).

Practice of BSE

Three-quarters ($n=222$; 75.3%) of the 295 respondents in this study practised BSE because they do not want to be diagnosed with BC.

Table 3. Knowledge of symptoms of breast cancer among the respondents (N=295)

Is this a symptom?	n (%)
Lump	
Yes	271 (91.9)
No	24 (8.1)
Discoloration	
Yes	240 (81.4)
No	55 (18.6)
Nipple discharge	
Yes	279 (94.6)
No	16 (5.4)
Sores	
Yes	234 (79.3)
No	61 (20.7)
Change in breast symmetry	
Yes	270 (91.5)
No	25 (8.5)
Change in breast size	
Yes	266 (90.2)
No	29 (9.8)

Most (74.9%) respondents practised BSE because they are aware of its benefit. A small number ($n=95$; 32.3%) of respondents practised BSE because of a family history of BC. A small number ($n=55$; 18.6%)

Table 4. Breast self-examination (BSE) attitudes among respondents (N=295)

Practice	n (%)
Can you detect early breast cancer by yourself?	
Yes	191 (64.7)
Not sure	82 (27.8)
No	22 (7.5)
I think BSE is time consuming	
Agree	36 (12.2)
Not sure	32 (10.8)
Disagree	227 (76.9)
I have a family history of breast cancer/know someone who has it	
Agree	96 (32.5)
Not sure	53 (18.0)
Disagree	146 (49.5)
Screening for abnormalities of BSE is important and useful	
Agree	257 (87.1)
Not sure	22 (7.5)
Disagree	16 (5.4)
I have no family history of breast cancer, so no need to practise BSE	
Agree	30 (10.1)
Not sure	25 (8.5)
Disagree	240 (81.4)
If I found a lump in my breast during BSE, I will report it after waiting for a while	
Agree	57 (19.3)
Not sure	48 (16.3)
Disagree	190 (64.4)
If I found a lump in my breast during BSE, I will report it immediately	
Agree	233 (79.0)
Not sure	33 (11.2)
Disagree	29 (9.8)
BSE is a good practice, and all women must be taught it	
Agree	283 (95.9)
Not sure	8 (2.7)
Disagree	4 (1.4)
In future, I will perform BSE	
Agree	259 (87.8)
Not sure	32 (10.8)
Disagree	4 (1.4)
Factors that encourage you to perform BSE	
Family history of breast cancer	127 (43.1)
Ordered by health personnel	130 (44.1)
Electronic or print media influence	102 (34.6)
Peer	34 (11.5)
Family	37 (12.5)

of respondents did not practise BSE because they were afraid of being diagnosed with BC. A total of 42 (14.2%) respondents said they did not practise BSE because they believed that they were not at risk of getting BC, while about half ($n=157$; 53.2%) did not practise BSE because they did not know how to do it correctly (Table 5).

Discussion

BC presents a formidable health threat to all females. Informing young females about this serious disease is both a challenge and an important investment in the health of future generations of

women.^[12,19] The role of BSE in the early detection of BC has been studied by several authors.^[20,21]

In the present study we found that respondents had general good knowledge of BSE when compared with a study conducted by Idris *et al.*^[12] in 2013, which found that undergraduate medical students had a poor understanding of BSE. This may be due to differences in time and study population, or availability of the internet and social media. Also, BSE was familiar to most of the respondents in this study (96.6%). This finding is in agreement with that of other studies conducted in Nigeria among female secondary school teachers (95.6%)^[22] and female health workers

Table 5. Breast self-examination (BSE) practice among respondents (N=295)

Knowledge	n (%)
I practise BSE because I don't want to be diagnosed with breast cancer	
Agree	222 (75.3)
Not sure	30 (10.2)
Disagree	43 (14.6)
I am fully aware of its benefit	
Agree	221 (74.9)
Not sure	59 (20.0)
Disagree	15 (15.1)
I have a family history of breast cancer/know someone who has it	
Agree	95 (32.2)
Not sure	45 (15.3)
Disagree	155 (52.5)
I don't practise BSE because I am afraid of being diagnosed with breast cancer	
Agree	55 (18.6)
Not sure	37 (12.5)
Disagree	203 (68.8)
I don't like touching my body	
Agree	30 (10.2)
Not sure	23 (7.8)
Disagree	242 (82.0)
I usually forget to practise BSE	
Agree	205 (69.5)
Not sure	34 (11.5)
Disagree	56 (19.0)
I'm not at risk of getting breast cancer	
Agree	42 (14.2)
Not sure	90 (30.5)
Disagree	163 (55.3)
I don't know how it is done correctly	
Agree	157 (53.2)
Not sure	47 (15.9)
Disagree	91 (30.8)

(100%).^[23] However, it is higher than that reported in a study conducted in Sudan (86%).^[12] A survey in the United Arab Emirates that showed that ~68.5% had heard about BSE^[24] and a study in Turkey, which showed that less than half of university students knew about BSE.^[25] In this study, 62.4% of respondents knew that BSE must be performed monthly, which is a higher figure than in a study conducted in Cameroon (37.3%).^[14] The majority (99.3%) of the respondents in this study perceived BSE as an important technique in the early detection of BC, but only 30.8% of them knew how to perform it correctly, and only 44.1% knew the right time for performing BSE (after menstruation). A higher Sudanese figure of 46.5% has been reported elsewhere.^[12] The main sources of information about BSE among the participants in this study were found to be mass media (internet and television), followed by ongoing lectures, physicians and friends. This finding was consistent with those of studies performed elsewhere.^[12,24] This finding shows that the media, especially the internet, can be used to increase women's awareness of the importance of BSE, as well as to instruct women on how to perform BSE.

Slightly more than half (58.3%) of our participants perceived that BC could be prevented, which is lower than the 94.4% and 95% reported by Sama *et al.*^[26] and Suh *et al.*,^[27] respectively.

When attitudes toward BSE were analysed, it was noted that more than half (64.7%) of students believed that they could detect early BC by themselves, which is similar to the results of a study conducted in Cameroon (59%).^[14] The majority of the population felt that 'BSE is a good practice and all women should be taught to do BSE'. A majority (95.9%) suggested the importance of self-examination in early diagnosis of BC. A majority (87.8%) of respondents said they would do BSE in the future.

In this study, 74.9% of students practised BSE owing to awareness of its benefit, while only 25.1% of students did not practise it. This finding is in agreement with that of a study conducted at the University of Sharjah,^[24] and contrasts with the findings of previous studies wherein unpleasantness and fear were potential barriers for practising BSE.^[28]

Study limitations

The study was confined to a sample of young, educated women in a semi-urban area, which does not necessarily reflect what transpires among women in rural areas. Furthermore, the example of the study population includes female medical students at the

University of Khartoum; hence, the results of the study cannot be generalised to a larger population in Sudan. Additionally, the sample size used in this study was small. The research could also be limited owing to the fact that it was based on self-reports, and women were not assessed on their ability to correctly perform BSE, which may have led to the overestimation of their knowledge on how to perform BSE.

Conclusion

This study revealed that although the awareness level was satisfactory, the practice of BSE by medical female students at the University of Khartoum was low, and associated with different factors. It found that even females who were aware of its importance did not always practise BSE owing to carelessness. We conclude that the intensive awareness campaign of BSE practice and BC should be continued regularly using mass media and ongoing lectures, and we suggest that BSE should be included in the curricula of female students at all levels.

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