Health Education and Cancer Mitigation among Female Tertiary Institution Students: The University of Calabar Perspective

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Received April, 2025, Accepted May, 2025Published June, 2025

Abstract

Breast cancer remains a significant public health concern, with early detection playing a crucial role in improving outcomes. This study investigated the impact of health education on breast cancer awareness and screening utilization among female undergraduates at the University of Calabar, Nigeria. A descriptive cross-sectional study was conducted to investigate the role of health education in cancer mitigation among female tertiary education students in the University of Calabar. A total of 500 female students were randomly sampled in a multistage sampling method in 10 faculties and one department from each and 50 respondents selected using convenience sampling technique. Bluman's method allows for unbiased selection of respondents. A semi-structured questionnaire was used and the data collected analyzed using SPSS version 20.0. The results revealed that while 89.6 % of respondents had heard of breast cancer, only 31 % knew its causes. Breast cancer screening utilization was extremely low at 0.6 %. Key barriers to screening included high cost (71.8 %), lack of available services (72 %), and fear of stigmatization (70 %). Only 14.4 % of respondents participated in breast cancer awareness health education programs. Despite fair general awareness, there is poor utilization of breast cancer screening services and limited participation in health education programs among female undergraduates. There is the heightened need for targeted interventions to improve breast cancer knowledge, address barriers to screening, and increase health education program participation. Specific actions include implementing comprehensive health education initiatives, improving accessibility of screening services, addressing cost barriers, and conducting further research to develop effective strategies for increasing breast cancer awareness and screening utilization.

Keywords: Breast cancer awareness, health education, screening utilization, female undergraduates, barriers to screening, Nigeria.

Introduction

Cancer is a genetic disease affecting a great number of people. Cancer-related deaths are common and are on the increase among all population groups in both the developed and developing countries (Ferlay, Soerjomataram, Dikshit, Eser, Mathers, Rebelo, Parkin, Forman & Bray, 2014).

Breast cancer is a type of cancer that develops from breast tissue (Hamashima, Aoki, Miyagi, Saito,Nakayama, Sagawa, Saito & Sobue, (2010); Saunders & Jassal, 2009). It is an aggressive disease affecting women, irrespective of their age category. Signs of breast cancer may include among others; lump in the breast, a change in breast shape, or a red scaly patch of skin (WHO, 2014). In those with distant spread of the disease, there may be bone pain, shortness of breath, or yellow skin (Koo, Von Wagner, Abel, McPhail, Rubin & Lyratzopoulos, 2017). Risk factors for developing breast cancer include being female, obesity, a lack of physical exercise, alcoholism, hormone replacement therapy during menopause, ionizing radiation, an early age at first menstruation, having children late in life or not at all, older age, and a family history of breast cancer (WHO, 2024).

Globally, breast cancer is the most prevalent cancer among women, comprising 23 % of all female cancer cases (ACS, 2016). It is the second leading cause of cancer-related deaths among women, accounting for 25.2 % of all cases (Phaswana-Mafuya & Peltzer, 2018). Women are particularly vulnerable and susceptible to breast cancer and their risks increases with advanced age (George, Allo, Amoo & Olonade, 2019). Nearly half of breast cancer cases and 60 % of breast cancer-related deaths are estimated to occur in middle-and-low-income countries (WHO, 2024). Global cancer statistics show increased global cases of breast cancer, and the rise is occurring at a faster rate in populations of the middle-and-low-income countries which may be due to increase in population growth and ageing (Lei, Zheng,

Zhang, Wang, Chen, Sun, Zeng, Zhou & Wei, 2021). It was estimated that by the year 2020, approximately 70 % of new breast cancer cases will occur among individuals in developing countries, population and groups that have previously enjoyed low incidence (Soerjomataram &

Bray, 2021). Breast cancer incidence rates are rapidly rising in developing countries, driven by several key factors including disparities in income as highlighted by several research (Wang, McLafferty, Escamilla, Luo & Ritzwoller, 2019). The adoption of western lifestyles, including dietary habits high in fats and calories, stigmatization of those with the health challenge is contributing to the increase in breast cancer cases, particularly among younger women in urbanized areas of developing nations (IARC, 2019; Reeler, Qiao & Dare, 2019).

Ghoncheh, Pournamdar & Salehiniya (2016) found that urbanization and associated lifestyle changes like physical inactivity, dietary shifts, and reproductive patterns significantly elevate the risk of breast cancer in these countries. The World Health Organization (WHO) additionally notes that as life expectancy increases, the risk of developing cancers like breast cancer also rises because cancer is primarily a disease associated with aging (WHO, 2018). Haque, Hisham, Ahmad, Azudin, Shafri & Haque (2016) cited these factors of increased life expectancy, growing urbanization, and the adoption of western lifestyles, particularly in younger women, as contributing to the rapidly increasing incidence rates of breast cancer in developing countries.

The American Cancer Society confirm that when breast cancer is detected early and treated promptly, the 5-year relative survival rate is over 90 %, aligning with the 92 % figure reported by Marcadis, Moris & Marti, 2022. The American Cancer Society's "Breast Cancer Facts and Figures 2019-2020" report indicates that the 5-year relative survival rate for localized breast cancer is 99 %. Additionally, the Surveillance, Epidemiology, and the End Results (SEER) Program's 2020 review reported a 5-year relative survival rate of 99 % for breast cancer patients diagnosed at a localized stage.

Nonetheless, the survival rate of women with breast cancer in Nigeria remains abysmally low. This is because of late presentation, with about 70-90 % of Nigerian women presenting late, hence diminishing survival probabilities compounded by exorbitant costs (Akanno, Obasi, Chukwuocha, Dozie, Ori, Sule, Ijeoma-Ogu & Innocent, 2023). This late presentation is due mainly to poverty, ignorance of the disease, negative perception, and negative attitude toward screening

and treatment services (Okoronkwo, Ejike-Okoye, Chinweuba & Nwaneri, 2015; Akanno *et al*., 2023).

In developing countries with no resources of mammography screening, breast self-examination (BSE) has been recommended as the most appropriate method for early detection of breast cancer as several previous studies have shown that women who had practice breast self-examination were more likely to be diagnosed with early stage of breast cancer (Olasehinde, Arije, Wuraola, Samson, Olajide, Alabi, Arowolo, Boutin-Foster, Alatise & Kingham, 2019). Breast self-examination is a screening technique for early breast cancer detection that can be performed by women at home. This is a simple, inexpensive, easy, and effective technique that allows women to examine their breast tissue for any physical or visual changes (Mendirata & Lentz, 2021).

Breast self-examination increases women's chances for treatment, thereby increasing the survival rate in women (Erbil & Bolukbas, 2014). It can help screen for tumours, cysts, and other abnormalities in the breasts. In resource constrained settings such as Nigeria, Breast self-examination (BSE) has been reported to be culturally and religiously acceptable, friendly, and incurring no cost (Oladimeji *et al.*, 2015). If detected early, breast cancer can be treated in the early stages of the disease, meaning Breast self-examination (BSE) is something all women should prioritize. Despite advances in treatment, detecting breast cancer as early as possible is important to maximize the potential for good health outcomes.

Despite interventions by both governmental and non-governmental organizations galvanizing action against breast cancer, the high incidence and mortality rate for this cancer still calls for concern. This indicates the need for more studies to ascertain recent levels of knowledge and perception and possibly re-strategize interventions. Understanding factors that influence patient delay is a prerequisite for strategies to shorten delay (Tejeda, Gallardo, Ferrans & Rauscher, 2016; Dan, 2018). As a result, it is highly important that all necessary effort must be made towards early presentation for treatment on the part of those affected. To do this, the role of accurate mass education cannot be overemphasized. To commence mass education, it is necessary that knowledge

levels and disposition of the public should be assayed (Egwuonwu, Anyanwu & Nwofor, 2012). Some studies have shown that factors related to women's knowledge and perception of breast cancer and its management may contribute significantly to medical help-seeking behaviors (Aderounmu, Oluwatosin & Akande, 2016; Tejeda *et al*., 2016; Wichendu & Dodiyi-Manuel, 2021).

Hence, health programs and screening for early detection of this disease among young females is becoming an important strategy. The true success of health education program on the breast, lies in its capacity to improve the knowledge of the group involved and modify their behavior to help detect breast mass early (Haji-Mahmodi, Montazeri, Jarvandi, Ebrahimi, Haghighat & Sowlat, 2012; Yako-Suketomo, Katayama, Ogihara & Asai-Sato, 2023). So, if female university students have sufficient knowledge about breast cancer, they can help prevent cancer in themselves and contribute to reducing the incidence of breast cancer in their community.

Female university students, particularly undergraduates, are a significant group that could benefit from targeted health education but are often overlooked in breast cancer awareness campaigns, despite the importance of establishing healthy habits and awareness early on (Gari *et al*., 2022). At the University of Calabar, there is little research on this group's awareness, prompting the need for this study to address the gap and develop tailored interventions.

Materials and Method

Study area

The study was conducted in the University of Calabar, Calabar, Cross River State, Nigeria on latitude 4.9524 and longitude 8.3408. The University of Calabar has a student population of 40,645 (University of Calabar information page, retrieved from www.unical.edu.ng).

Study design

The study design adopted for this study was a descriptive cross-sectional study using a quantitative and qualitative method of data collection aimed at determining the role of health education on breast cancer awareness among University of Calabar female undergraduate students.

Study population

The study population consisted of female undergraduates from across 10 faculties and departments in the University of Calabar.

Sample size determination

The sample size for this study was determined using Bluman's formula (2004). Bluman's method allows for unbiased selection of respondents. Therefore, the sample size used for this study was 500.

Selection of faculties

Simple random sampling was used to select ten (10) faculties out of the sixteen (16) faculties in the University of Calabar. Numbers were assigned to each faculty, folded and put in a basket, it was shuffled and ten were picked one after the other without replacement.

Selection of departments

Simple random sampling was also used to select one (1) department in each of the selected faculties making a total of ten (10) departments. Numbers were assigned to each department, folded and put in a basket. It was shuffled and ten were selected for the study.

Selection of respondents

In each of the selected departments, 50 respondents (500/10 = 50) were selected using convenience sampling technique.

Instrument(s) for data collection

A semi-structured questionnaire, written in English language was administered to the respondents. The questionnaire consisted of four sections where Section A was concerned with the socio-demographic characteristics of the respondents. Section B contained questions on the role of health education on breast cancer awareness, section C captured utilization of available screening services and section D focused on factors influencing utilization of available screening services.

Pre-testing

The research instrument for this study was pre-tested in University of Cross River using 50 female undergraduates (10 % of the total sample size) to determine its validity and reliability.

Inclusion and exclusion criteria

The study included only female undergraduates at the University of Calabar that gave their consent.

Method of data analysis

Each complete questionnaire was properly checked to ensure there was no missing data. Data was collected using interviewee-administered semi-structured questionnaire. The questionnaire assessed the socio-demographic characteristics of the respondents and assessed their knowledge of breast cancer, perception, utilization and attitude toward breast cancer screening/breast self-examination. The questionnaires were distributed to recruited respondents. The researchers then explained the questions in the different sections of the questionnaire, after which the research subjects/respondents were allowed to fill the questionnaire by themselves and return to the researchers. A total of 500 (50 per Department each in 10 faculties) questionnaires were distributed. The returned questionnaires were reviewed for completeness.

Data was analyzed using Statistical Package for Social Sciences (SPSS) software version 20.0. The results were presented in the form of descriptive and inferential statistics. The descriptive statistics included frequencies, tables, percentages, and figures in the form of pie and bar charts. This was employed for the purpose of summarization of data.

Consent/approval

All respondents were assured of confidentiality as well as anonymity. Verbal consent was obtained from respondents before questionnaires were administered. The opportunity to decline at any point was given to the respondents.

Results and discussion

Results

This study identified the impact of health education programs on improving awareness of breast cancer and breast self-examination (BSE) among female students at the University of Calabar, Calabar. The study also provided an indication of what could be expected in the general population, as women were presumed to have access to health-related information. The findings would serve as a foundation for accurate planning by concerned bodies.

Demographic characteristics of respondents

Most respondents, representing 265 (53.4 %), were aged between 25 and 29 years, followed by those aged 20 to 24 years, who made up 125 (25 %). Respondents aged between 30 and 34 years accounted for 40 (8 %), those aged 35 to 39 years were 39 (7.8 %), those aged 40 to 44 years were 1 (0.2 %), and those aged 15 to 19 years were 28 (5.6 %). Regarding education level, majority of respondents, representing 214 (42.8 %), were in their 400 level, 150 (30 %) were in their 300 level, 37 (7.4 %) were in their 100 level, and 99 (19.8 %) were in their 200 level.

Marital status showed that 443 (88.6 %) of respondents were single, 56 (11.2 %) were married, and 1 respondent (0.2 %) was widowed. Employment status revealed that 398 (79.6 %) were unemployed students, while 102 (20.4 %) were employed students. Religious affiliation indicated that 430 (86.1 %) were Christians, 34 (6.8 %) were Muslims, and 13 (2.6 %) were traditionalists. In terms of monthly income, 326 (65.3 %) of respondents earn <20,000-50,000 Nigerian naira per month, 137 (27.4 %) earn 50,000-100,000 Nigerian naira per month, while 37 (7.3 %) earn >100,000 Nigerian naira per month (Table 1).

Table 1: Socio-demographic characteristics of the respondents

Variables	Frequency (500)	Percentage
Age		
15-19	28	5.6
20-24	125	25
25-29	265	53.4
30-34	40	8
35-39	39	7.8
40-44	1	0.2
45-49	0	0
Level of education		
100	37	7.4
200	99	19.8
300	150	30
400	214	42.8
Department		
Accounting	50	10
Biochemistry	50	10
Dentistry	50	10
English and Literary Studies	50	10
Genetics and Biotechnology	50	10
Geology	50	10
Human kinetics & Health Edu.	50	10
Law	50	10
Nursing Science	50	10
Tourism	50	10
Total	500	100
Marital status		
Single	443	88.6
Married	56	11.2

Widowed	1	0.2
Divorced	0	0
Occupation		
Student & employed	102	20.4
Student & Unemployed	398	79.6
Religion		
Christian	430	86.1
Muslim	34	11.2
Others specify	13	2.6
Income per month (₦)		
<20,000-50,000	326	65.3
50,000-100,000	137	27.4
100,000>	37	7.3

Knowledge of breast cancer

Majority of the respondents, representing 448 (89.6 %), had heard of breast cancer, while 52 (10.4 %) had not. Of those who had heard of breast cancer, 230 (51.3 %) learned about it via the internet, 87 (25.1 %) through television, 43 (9.5 %) from friends, 31 (6.9 %) from family, 23 (6.6 %) through the radio, 16 (4.6 %) via newspapers, 5 (1.4 %) from magazines, and 16 (3.5 %) could not remember where they heard about it. When asked if breast cancer can be prevented, 205 (45.7 %) of respondents said it cannot, while 243 (54.2 %) believed it can. Regarding the lethality of breast cancer, 213 (69.9 %) said it can kill, while 135 (30.1 %) said it cannot.

Additionally, 139 (31.0 %) of respondents knew the causes of breast cancer, while 309 (69.0 %) did not. Among those who knew the causes, 51 (36.9 %) cited excessive alcohol consumption, 41 (29.8 %) mentioned obesity, 22 (15.5 %) pointed to having multiple sex partners, 13 (9.5 %) cited cigarette smoking, and 12 (8.3 %) indicated having more than three children as causes of breast cancer.

A total of 282 (56.4 %) respondents had heard of breast cancer screening, while 218 (43.6 %) had not. Among them, 195 (69.1 %) knew why breast cancer screening is conducted, while 87

(31.0 %) did not. When asked why breast cancer screening is carried out, 61 (31.2 %) said it is to detect problems in the breast, 63 (27.1 %) to detect cancer, 35 (18.0 %) to detect changes in breast cells, 25 (12.8 %) did not know why it is carried out, and 19 (9.7 %) believed it is to detect STDs.

When questioned about the effectiveness of early detection, 324 (64.7 %) respondents thought the chances of curing breast cancer would be better if discovered early, while 176 (35.3 %) did not. Regarding knowledge of breast cancer symptoms, 270 (54.1 %) did not know the symptoms, while 230 (45.9 %) did. (Table 2, Figure 1).

Table 2: Knowledge of breast cancer

Variables	Frequency	Percentage
Ever heard of breast cancer?		
Yes	448	89.6
No	52	20.4
Total	500	100
If "Yes", how did you know about breast cancer?		
Newspaper	13	2.9
Magazine	5	1.1
Television	87	19.4
Radio	23	5.1
Internet	230	51.3
Through a friend	43	9.5
Family	31	6.9
Cannot remember	16	3.5
Total	448	100
Can breast cancer be prevented?		
Yes	243	54.2
No	205	45.7
Total	448	100

Can breast cancer kill?		
Yes	313	69.8
No	135	30.1
Total	448	100
Do you know the causes of breast cancer?		
Yes	139	31.0
No	309	69
Total	448	100
If "Yes", tick as many as you know		
Cigarette smoking	13	9.5
Having more than 3 children	12	8.3
Obesity	41	29.8
Having multiple sex partners	22	15.5
Excessive consumption of alcohol	51	36.9
Total	139	100
Have you ever heard of breast cancer screening?		
Yes	282	56.4
No	218	43.6
Total	500	100
If "Yes", what was your source of information?	21	7.6
Newspaper	18	7.0
Magazine	61	21.6
Television	30	10.5
Radio	96	33.9
Internet	31	11.1
Through a friend	25	8.8
Family	282	100
Total		

Do you know why breast cancer screening is carried out on women?		
Yes	195	69
No	87	31
Total	282	100
If "Yes" why is breast cancer screening carried out?		
To detect cancer	53	27.1
To detect changes in breast cells	35	18.0
To detect problem in breast	61	31.2
To detect STD	19	9.7
I don't know	25	12.8
Total	195	100
Do you think chances of having breast cancer will be better if discovered early?		
Yes	324	64.7
No	176	35.3
Total	500	100
Do you know the symptoms of breast cancer?		
Yes	230	45.9
No	270	54.1
Total	500	100
If "Yes", what are they?		
Change in breast shape	18	7.9
Irregular nipple bleeding	35	15.1
Bone pain	15	6.5
Lump in the breast	61	26.6
Yellow skin	20	8.6

Red scaly patch of skin	28	12.2
Loss of weight	45	19.4
Fatigue	8	3.6
Total	230	100
Has anyone in your family had breast cancer?		
Yes	2	0.3
No	475	95
I don't know	23	4.6
Total	500	100

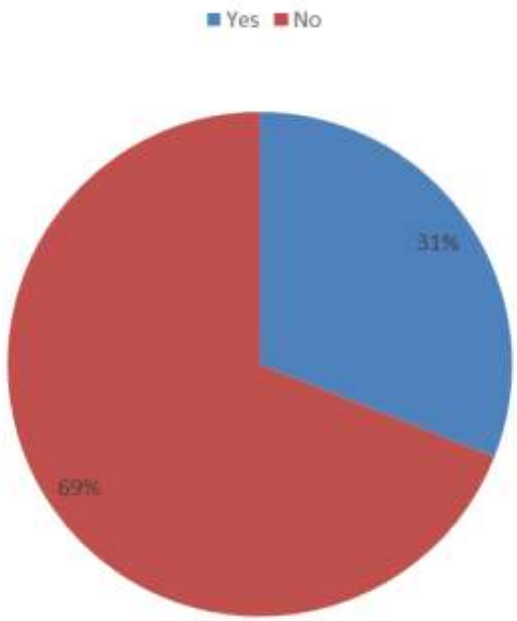

Fig. 1: Causes of breast cancer

Among those who knew the symptoms, 61 (26.6 %) indicated a lump in the breast, 45 (19.4 %) indicated weight loss, 35 (15.1 %) pointed to irregular nipple bleeding, 28 (12.2 %) mentioned a red scaly patch of skin, 20 (8.6 %) cited yellow skin, 18 (7.9 %) indicated a change in breast shape, 15 (6.5 %) cited bone pain, and 8 (3.6 %) mentioned fatigue.

Finally, most respondents, representing 475 (95.0 %), indicated that none of their family members had breast cancer, 23 (4.6 %) did not know, and 2 (0.3 %) said yes.

Utilization of breast cancer screening services and health education

Table 3 shows the utilization of breast cancer screening among the respondents. Most respondents, representing 497 (99.4 %), have never been screened for breast cancer, while a very small fraction, representing 3 (0.6 %), have been screened for breast cancer. Of those screened, 2 (66.7 %) did so because their doctor requested it, and 1 (33.3 %) screened because she had a lump in her breast.

Among those who did not screen, 216 (55.4 %) indicated they had never heard of breast cancer screening, 55 (11.0 %) said they had never heard of breast cancer, 59 (11.9 %) cited expense as the reason, and 167 (33.6 %) stated they did not have the time. No respondents indicated distance from home as a reason for not screening. None of the respondents, 500 (100 %), had gone for breast cancer screening in the last 12 months.

Regarding knowledge about who should get screened, 192 (38.4 %) of respondents did not know, 131 (26.2 %) indicated that any female should get screened, 98 (19.6 %) said only married women should get screened, and 79 (15.8 %) indicated that only unmarried women should be screened. In terms of the appropriate age for screening, 195 (39 %) of respondents indicated a woman should get screened at the age when she gets married, 143 (28.7 %) indicated at age 30-39, 84 (16.8 %) indicated below 21 years, and 78 (15.5 %) indicated at age 21 only. (Table 3, Figure 2).

Table 3: Utilization of breast cancer screening services and health education

Variables	Frequency	Percentage
Have you ever been screened for breast cancer?		
Yes	3	0.6
No	497	99.4
Total	500	100
If “Yes”, why where you screened?		
Irregular nipple bleeding	-	-
Doctor’s request	2	66.7

Lump in breast	1	33.3
To know if I am healthy	-	-
Total	3	100
If "No", what is the reason?		
Never heard of breast cancer	55	11.0
Never heard of breast cancer screening	216	43.5
It is expensive	59	11.9
I don't have the time	167	33.6
Clinic is too far from home	-	-
Total	497	100
Have you gone for B.C screening in the last 12 months?		
Yes	-	-
No	500	100
Total	500	100
Who should get screened for breast cancer?		
Any female	131	26.2
Only unmarried women	79	15.8
Only married women	98	19.6
I don't know	192	38.4
Total	500	100
When should a woman get screened for breast cancer?		
Below 21 years	84	16.8
At age 21 only	78	15.5
At the age which she gets married	195	39
At age 30-39	143	28.7
Total	500	100
How often should a woman go for breast cancer screening?		
Once in a lifetime		
Once in every month	70	14
Once in a year	78	15.6
Once every three years	166	33.2
Total	186	37.2
	500	100

Can regular screening help prevent breast cancer?		
Yes	291	58.2
No	209	40.8
Total	500	100
Have you participated in any health education programs on breast cancer awareness?		
Yes	72	14.4
No	428	85.6
Total	500	100
If "Yes" please rate the effectiveness of these programs		
Not effective at all	3	4.1
Somewhat effective	1	1.4
Moderately effective	17	23.6
Very effective	31	43.1
Extremely effective	20	27.8
Total	72	100

Regarding the frequency of screening, 186 (37.2 %) of respondents indicated that breast cancer screening should be carried out once every three years, 166 (33.2 %) suggested once a year, 78 (15.6 %) recommended once every month, and 70 (14 %) suggested once in a lifetime. In terms of the perceived effectiveness of regular screening, 291 (58.2 %) agreed that regular screening can prevent breast cancer, while 209 (40.8 %) disagreed.

A total of 428 (85.6 %) respondents had never participated in any health education programs on breast cancer awareness, while 72 (14.4 %) had participated. Of those who participated, 31 (43.2 %) rated the program very effective, 20 (27.8 %) rated it extremely effective, 17 (23.6 %) rated it moderately effective, 3 (4.1 %) rated it not effective at all, and 1 (1.4 %) rated it somewhat effective.

Fig. 2: Number of participants screened/not screened for breast cancer

Factors that influence utilization of breast cancer screening

Most respondents, representing 359 (71.8 %), identified the high cost of screening as a factor influencing the utilization of screening services, while 141 (28.2 %) did not consider cost as a limiting factor. Similarly, 360 (72 %) indicated that the availability of screening services was a limiting factor, whereas 140 (28 %) did not see availability as an issue. Regarding awareness of screening locations, 312 (62.4 %) of respondents did not know where to get screened, while 188 (37.6 %) did not see this as a limiting factor. A significant fraction, representing 378 (75.6 %), highlighted the distance to the source of service as a barrier, while 122 (24.4 %) did not consider distance a barrier. Additionally, 365 (73 %) reported that they could not access the clinics, whereas 135 (27 %) did not see clinic access as a barrier. (Table 4).

Table 4: Factors influencing utilization of breast cancer screening

Variables	Frequency (500)	Percentage
Cost of screening is high		
Yes	359	71.8
No	141	28.2

No available screening services		
Yes	360	72
No	140	28
I do not know where to get screened		
Yes	312	62.4
No	188	37.6
Distance to source of service is far		
Yes	122	24.4
No	378	75.6
I cannot access the clinics		
Yes	135	27
No	365	73
My family influences my decision to get screened		
Yes	51	10.2
No	449	89.8
I am not at risk of developing breast cancer		
Yes	359	71.9
No	141	28.1
My culture prevents me from getting screened		
Yes	32	6.4
No	468	93.6
My religion does not permit me		
Yes		
No	18	3.6
	482	96.4
I am afraid of been stigmatized		
Yes	350	70
No	150	30

When considering family influence, 449 (89.8 %) of respondents stated that their decision to get screened was not influenced by family, while 51 (10.2 %) cited family influence as a factor. Majority of the respondents, representing 359 (71.9 %), indicated that they did not perceive themselves at risk of developing breast cancer, while 141 (28.1 %) believed otherwise. Cultural influences were not a limiting factor for 468 (93.6 %) of respondents in their decision to get screened, whereas 32 (6.4 %) considered culture a limitation. Conversely, 482 (96.4 %) of the respondents stated that their decision to get screened was not influenced by religious factors, while 18 (3.6 %) were influenced by religion.

Finally, 350 (70 %) of respondents considered the fear of stigmatization as a restricting factor in utilizing breast cancer screening services, while 150 (30 %) did not consider stigmatization a factor influencing their decision to utilize these services.

Discussion

The study on knowledge of breast cancer among female undergraduates at the University of Calabar showed that 69.8 % of respondents were aware that breast cancer can be fatal, though less than half knew it could be prevented. This level of awareness was not surprising, as most respondents indicated they obtained information from the internet, television, friends, and other sources. It is logical to assume that as students, they are exposed to various sources of information and have extensive social networks. These findings contrast with Dan (2018) assessment of rural women's knowledge and awareness of breast cancer in the central senatorial district of Cross River State, Nigeria. Dan's study found that 80.0 % (2383/2978) of participants had poor knowledge of breast cancer and screening services. It concluded that while most women were aware of breast cancer as a disease, their in-depth knowledge (understanding the specific signs and symptoms, risk factors, screening and detection methods, treatment options, and prevention strategies) was poor.

Findings from this present study also showed that knowledge about the causes of breast cancer was significantly low, with over two-thirds of the respondents unaware of the causes (69 %). These findings are consistent with the study by Aderounmu *et al.* (2016), which concluded that

knowledge of the etiological causes of breast cancer, including risk factors, was abysmally low among Nigerian women.

Findings from this study also showed that over 20.4 % of respondents had never heard of breast cancer screening, and a significant number did not know the purpose of breast cancer screening for women. The study also aligns with those of Okobia *et al.* (2006) conducted in Ibadan. The investigators aimed to assess the level of knowledge of breast cancer screening services among women in the community and found that 65 % of the women had poor knowledge of the symptoms that may indicate breast cancer, as well as poor knowledge of screening services. Most women who noticed a lump in their breasts delayed seeking medical attention for 6-12 months because "it is not painful." Unfortunately, breast cancer typically begins as a painless lump, with pain occurring only when the disease is advanced or accompanied by infection.

Findings from the study on the role of health education in the utilization of breast cancer screening services showed a very poor utilization rate, with only 0.6 % of the respondents having undergone screening for breast cancer. The primary reasons for screening were the detection of a lump in the breast and a doctor's request. Majority of respondents who had never been screened indicated that poor knowledge of breast cancer and breast cancer screening were the reasons for not screening, highlighting the need for improved health education on the topic. These findings are in line with the study by Haji-Mahmoodi *et al.* (2012) which identified the relationship between knowledge of risk factors, perception of the disease, practice of preventive procedures, and the uptake of available screening services among women to help estimate their level of vulnerability.

The study on factors influencing the utilization of breast cancer screening services revealed that poor knowledge of available screening services, the cost of screening, and the lack of availability of screening centers were among the barriers to the uptake of these services identified by respondents. These findings align with those of Egwuonwu *et al.* (2012) who concluded that while screening mammography is the most effective method for early detection of breast cancer and are widely practiced in the developed world, its use is low in Nigeria and other developing

countries due to cost. It is also consistent with the study by Okoronkwo *et al.* (2015) which found that financial barriers limit the ability of women, particularly rural women in the poorest groups, to utilize screening and treatment services for the early diagnosis and treatment of breast cancer.

The results from this study showed that the ability to access clinics for breast cancer screening was a significant factor limiting its utilization. Geographic barriers were particularly important for women living in rural or rural-urban areas in Nigeria. These women may be unable to obtain regular breast cancer screenings because these services are not available at their local general hospitals (Wang *et al.*, 2019).

An interesting finding from this study also showed that most respondents did not believe they were at risk of breast cancer, which influenced their decision to utilize screening services. Additionally, about 24.4 % of the respondents indicated that the distance to health facilities was a factor influencing the uptake of cervical cancer screening services. The study also highlighted the fear of stigmatization as a major factor limiting the utilization of breast cancer screening services and this position agreed with the study by Reeler *et al.* (2019) which stated that several factors contribute to the lack of effective breast cancer services. Women, particularly those in rural communities, may conceal their symptoms to protect their family's marginal finances and to increase the marriage prospects of their daughters.

The study revealed that the female undergraduates at the University of Calabar had fair knowledge, but a poor/low level of utilization of breast cancer screening services. The findings also indicated that factors such as the cost of screening, lack of awareness of available screening services, and poor attitude towards the risk of developing breast cancer affected the utilization of these services. Given the level (fair) of knowledge and utilization of breast cancer screening services observed among female undergraduates at the University of Calabar that may be considered an urban area, one can only imagine the dire situation in rural areas. Therefore, it is imperative that the government takes proactive measures to create awareness by organizing seminars and programs on the benefits of utilizing breast cancer screening services, especially

targeting rural communities. These initiatives will play a crucial role in minimizing the risk of developing breast cancer and improving overall health outcomes in these underserved areas.

Summary

This study found that breast cancer remains a major health concern among women. Among female students at the University of Calabar, factors such as lack of screening, limited healthcare access, and lifestyle choices stood as clear risk factors. Health education plays a vital role in empowering students with knowledge for early detection and prevention. Effective health education will help students recognize warning signs, prioritize regular screenings, and adopt healthy habits such as balanced diets and exercise. However, barriers like misinformation, financial constraints, and low prioritization of preventive care would limit awareness and action.

Conclusion

The study revealed a lack of understanding among respondents regarding the causative factors, prevention, and screening methods for breast cancer. Additionally, factors such as poor knowledge of causative factors, high cost, unavailability of screening services, and fear of stigmatization were identified as contributing to the poor utilization of breast cancer screening services. The role of health education in the utilization of breast cancer screening services was identified to be very poor and require urgent action. Furthermore, respondents mentioned barriers such as inadequate knowledge of screening locations and the belief that they were not at risk of breast cancer.

Recommendations for policy direction

Based on the findings of this study, the following recommendations are made:

i. Delivering appropriate health education on breast cancer screening is crucial, especially considering that many respondents have not heard about it and are unaware of its benefits. This education should target students and women in the rural community at large.

ii. Bringing breast cancer screening services closer to women by placing them in strategic locations can facilitate easier utilization and reduce barriers to access.

iii. Implementing a policy to subsidize the cost of screening services would help encourage more women to utilize breast cancer screening.

iv. Disseminating accurate information and dispelling misconceptions about breast cancer screening can be achieved using information, education, and communication materials strategically placed in various locations such as Universities and Colleges, health centers and clinics, community centers and libraries, banks, shopping malls and markets, bus stations and social media platforms among others. This approach can help foster a positive attitude towards utilization and promote active participation in breast cancer screening services.

iv. Further studies are also needed to cover a larger segment of the population, allowing for a more comprehensive understanding of which areas require targeted interventions to improve health services and promote the utilization of breast cancer screening services.

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