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ORIGINAL ARTICLE

PERCEPTION OF BREAST CANCER RISK AND DETERMINANTS OF SCREENING BEHAVIORS AMONG FEMALE UNDERGRADUATE STUDENTS AT A NIGERIAN PRIVATE UNIVERSITY

Akinwumi AF,¹ Idowu A.²

¹Department of Community Medicine, Ekiti State University, Ado Ekiti, Nigeria

²Department of Community Medicine, Bowen University, Iwo, Osun State, Nigeria

KEYWORDS

Attitude,

Awareness,

Breast Cancer,

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Knowledge,

Screening.

ABSTRACT

Background This study assessed perceived risk, breast cancer knowledge, screening attitudes and determinants of screening practices among students at Bowen University, Iwo, Nigeria.

Methods: A cross-sectional design was employed, and a multistage sampling method used to recruit 400 eligible respondents after obtaining ethical approval for the study. A pre-tested, self-administered, and semi-structured questionnaire was used for data collection between May and July 2022. Data were analyzed using Statistical Package for Social Sciences (IBM SPSS Statistics, version 25). The primary study outcomes were respondents' knowledge of breast cancer, attitude to breast cancer screening and screening practices. Both descriptive and inferential statistics were carried out at $p < 0.05$.

Results: The mean age ($\pm$ SD) of respondents was 20 ± 6.9 years, 49.0% of them were adolescents aged 15-19 years. Breast cancer risk perception rate was low (1.2%) among respondents, less than three-quarter (70.0%) possessed good knowledge of breast cancer but 82.3% of them had positive attitude towards screening while only 28.8% had ever screened. Determinants of breast cancer screening uptakes were respondents' age (AOR=0.30; 95%CI=0.186-0.475), length of stay in school (AOR=0.42; 95%CI=0.266-0.646), family history of breast cancer (AOR=0.29; 95%CI=0.140-0.585) and attitude to screening (AOR=2.1; 95% CI=1.075-3.909).

Conclusion: Despite high breast cancer awareness, relatively good knowledge and positive screening attitude, risk perception and screening uptake were low among the respondents. Policy makers should design cost-effective breast cancer awareness campaigns, to correct the low-risk perception among female university students in Nigerian and improve screening practices through BSE among them.

Correspondence to:

Adebowale Femi Akinwumi

fmakinwumi@gmail.com

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INTRODUCTION

Breast cancer is currently the most prevalent cancer globally, reported in every nation and affecting women of reproductive age.¹ At least, 2.3 million women were diagnosed with breast cancer, and 670,000 deaths were recorded globally in 2022 alone.¹ The five-year global burden of breast cancer was estimated at 7.8million at the end of 2020, and the disease currently accounts for the highest loss in Disability Adjusted Life Years (DALYs) among women worldwide.¹

Breast cancer is said to be occurring at epidemic proportion in most African countries.² A study conducted in 2018 revealed that the age-standardized mortality rate for breast cancer was highest in Africa, with Sub-Saharan Africa (SSA) currently having the highest incidence rate globally.³ A Global Cancer Observatory (Globocan) report shows that the prevalence of breast cancer was the highest at 22.7% of all new cancer cases diagnosed among Nigerians in 2020. The disease also accounted for 38.7% of all new cancer cases and 14,274 deaths among Nigerian women in the same year.⁴ Also, the disease had an age-standardized incidence rate of 26.1/100,000 and a five-year prevalence of 59.31 per 100,000 women.⁴

Being a woman appears to be the strongest risk factor for breast cancer occurrence, although other modifiable and non-modifiable risk factors have been documented. For instance, women with inherited 'high penetrance' mutation genes (BRCA 1, BRCA 2 and PALB-2) are mostly at risk of breast cancer development.¹

One of the most cost-effective breast cancer control measures is early detection through screening. More emphasis has been placed on breast cancer screening through mammography in the developed countries, but less attention has been placed on affordable screening methods such as Breast Self-Examination (BSE) and Clinical Breast Examination (CBE). In poor resource settings such as Nigeria, where women have limited access to cancer diagnostic facilities including mammography, and where breast cancer tends to occur at a younger age, BSE and CBE become significant screening procedures. It has been shown that monthly BSE can help young ladies get familiar with the shapes and sizes of their breasts

and to report any abnormality to healthcare providers, thereby setting the stage for CBE and subsequent mammography early enough. Empirical evidence has proven the importance of CBE in early breast cancer detection; hence, the recommendation that this procedure be part of periodic medical examinations, especially for average-risk asymptomatic women who are in their 20s and 30s.⁵

The objective of the WHO Global Breast Cancer Initiative (GBCI) is to reduce global breast cancer mortality by 2.5% per year and to prevent 2.5 million breast cancer deaths globally between 2020 and 2040 among women.¹ For this goal to be actualized, research that focuses on early breast cancer detection through screening needs to be prioritized.

In Nigeria, one of the main objectives of the National Cancer Control Plan is to have at least 50% cancer detection rate among eligible Nigerians by 2022.⁶ However, screening practice has remained abysmal in the country.^{7,8,9,10} Also, most Nigerian studies have focused on assessing knowledge of Nigerian students regarding BSE; not many of them have comprehensively examined knowledge, attitude, and practices of other methods of breast cancer screening among the students.¹¹ Besides, a study among undergraduates in Ghana revealed a gap between awareness and practice of breast cancer screening.¹² Not many past studies have examined the impact of risk perception on breast cancer screening practices among Nigerian undergraduate female students. This study assesses respondents' breast cancer risk perception, breast cancer knowledge, attitude to screening and determinants of breast cancer screening practices.

METHODS

STUDY SETTING AND STUDY

POPULATION

This cross-sectional study was conducted among 400 undergraduate students at Bowen University, Iwo, South-West Nigeria. The university has seven colleges and offers about 45 courses. All fully registered female students at the university who gave consents/assents were included in the study. Students on industrial training off campus or those writing exams during the data collection period were excluded from the study.

Table 1: Socio-demographic Characteristics of Respondents

Variables	Frequency N=400	Percentage
Age group		
15 – 19	196	49.0
20 – 24	204	51.0
Mean ± SD	20 ± 6.91	
Religion		
Christianity	375	93.8
Islam	20	5.0
Traditional	5	1.2
Ethnicity		
Yoruba	319	79.8
Hausa	6	1.5
Igbo	30	7.5
Others (Urhobo, Idoma, Edo, Igala)	45	11.2
Marital status		
Never married	392	98.0
Married	5	1.2
Separated	3	0.8
Course of study		
Nursing	33	8.3
Anatomy	12	3.0
Medical laboratory science	18	4.5
Physiology	26	6.5
Public health science	138	34.5
MBBS	73	18.3
Physiotherapy	71	17.8
Nutrition and Dietetics	29	7.3
Years in school (Class level)		
1 – 3	227	56.8
4 – 7	173	43.2
Number of pregnancies		
Nil	395	98.8
1	5	1.2
Age at menarche		
≤ 10	49	12.2
11 – 15	343	85.8
≥ 16	8	2.0
Mean ± SD	12 ± 1.51	
Socio-economic class		
High	199	49.8
Middle	184	46.0
Low	17	4.2
Family history of breast cancer		
Yes	34	8.5
No	366	91.5

SAMPLE SIZE DETERMINATION

We used the Leslie-Kish formula to estimate sample size for a population of fewer than 10,000. A

standard normal deviate at the 95% confidence level (1.96), a tolerable margin of error of 5%, and 74% of participants were assumed to have heard of breast

cancer screening based on findings from a past study. 13 A non-response rate of 10% was envisaged and corrected for. Furthermore, a cluster effect of 1.2 was applied to estimate a minimum sample size of 395, but the study included 400 respondents.

SAMPLING METHOD

A multistage sampling method was used in recruiting eligible respondents. In the first stage, the university was stratified into clusters, which are the seven existing colleges. Next, one cluster/college was selected using a simple random method (balloting) from a list of seven existing colleges that formed the sampling frame. The selected cluster was the College of Health Sciences. Subsequently, the selected college was stratified into programs and eligible respondents were recruited by proportional allocation.

DATA COLLECTION METHOD AND MATERIALS

A self-administered, semi-structured questionnaire was developed by the principal investigators after reviewing published literature on the research topic, and was used for data collection.^{3,11,14} The instrument collected information on respondents' biodata, breast cancer risk perception, knowledge on breast cancer, attitude to breast cancer screening and practice of breast cancer screening. The instrument was designed using simple English language for easy understanding by the respondents. Five students in the Public Health department were trained for three days on questionnaire administration and assisted in data collection, which took place between May and July 2022.

PRE-TESTING

The questionnaire was pre-tested with 40 students at a different college (College of Law) within the same university, recruited via convenience sampling. During this stage, feedback from respondents and data collectors was carefully reviewed and analysed. Questions that were unclear or ambiguous were rephrased to ensure clarity. The average time it took respondents to complete the questionnaire was also ascertained.

DATA MANAGEMENT

All administered questionnaires were cross-checked daily to ensure data completeness. Data analyses

were carried out using the Statistical Package for Social Sciences (IBM SPSS Statistics for Windows, version 25). Categorical data were summarized as percentages and presented in tables and charts, while continuous data were summarized as mean and standard deviation. The chi-square test was used to compare categorical variables. Moreover, a stepwise logistic regression was built at the multivariate level. Variables were selected for the model based on their statistical significance at the bivariate level. The 95% confidence intervals (CIs) and adjusted odds ratios (AORs) were estimated to identify predictors of breast cancer screening uptake among respondents at $p < 5\%$.

DEFINITION OF KEY VARIABLES

RESPONDENTS' KNOWLEDGE ON BREAST CANCER

This was assessed using 10 questions on basic knowledge of respondents regarding breast cancer risk factors, symptoms and complications. Each correct answer attracted 2-points. Respondents' aggregate scores were obtained and converted to percentages. Those who scored less than 50% were classified as having poor knowledge of the disease; those who scored 50-69% were designated as having fair knowledge; and those who scored 70% and above were designated as having good knowledge.

RESPONDENTS' ATTITUDE TO BREAST CANCER SCREENING

Ten statements were positively phrased and rated on a 5-point Likert scale ranging from 5-strongly agree to 1-strongly disagree. Aggregate scores for each respondent were obtained and converted to percentages. Those who scored at least 50% were classified as having a positive attitude to screening, while those with less than 50% were categorized as having a poor attitude to screening.

RESPONDENTS' SOCIO-ECONOMIC STATUS

A composite scale was used in estimating this variable.¹⁵ The scale combined respondents' mothers' educational levels with their fathers' occupational types. Mothers' education ranged from 5 (tertiary education) to 1 (no formal education). However, fathers' occupation ranged from 5 (Highly skilled workers, professionals and

Table 2: Breast Cancer Awareness, Risk Perception, Knowledge and Attitude to Screening

Variable	Frequency; N=400	Percentage (%)
Heard of breast cancer		
Yes	395	98.8
No	5	1.2
Main sources of information on breast cancer		
Internet	210	53.2
Friends	14	3.5
Health Staff	106	26.8
Mass Media	55	13.9
Print media	10	2.6
Perceived breast cancer risk factors*	n =395	
Use of oral contraceptives	110	27.8
Lack of regular exercise	112	28.4
Obesity	168	42.5
Cigarette smoking and alcohol abuse	292	73.9
Family history	367	92.9
Delay in getting pregnant	85	21.5
Refusing to breastfeed	147	37.2
Old age	219	55.4
Spiritual attack	92	23.3
Early commencement of menstruation and late menopause	86	21.8
Perceived symptoms of breast cancer*		
Lump in the breast	387	98.0
Pain in the breast	369	93.4
Swollen breast	297	75.2
Nipple discharge	303	76.7
Change in colour of the skin over the breast	307	77.8
Shrinking of the breast	193	48.9
Sagging in the breast	44	11.0
Sores in the breast	315	79.7
Unexplained weight loss	228	57.7
Knowledge on breast cancer screening methods*		
Breast self-examination	329	83.3
Clinical breast examination	365	92.4
Breast ultrasound	311	78.7
Mammography	297	75.2
Fine needle aspiration cytology	172	43.5
Do you think you can be at risk of breast cancer?		
No	395	98.8
Yes	5	1.2
Overall Knowledge score		
Poor	15	3.8
Fair	105	26.3
Good	280	70.0
Attitude to breast cancer screening		
Positive	329	82.3
Negative	71	17.8

*Multiple responses allowed

successful business owners) to 1 (unemployed, students, subsistence farmers). Respondents' scores from the two parameters were summed and rated on a scale of 10. Respondents who scored fewer than 5 points were placed in the lower socio-economic class. Those who scored 5-7 points were categorized as the middle socio-economic class, while those with scores above 7 were categorized as the high socio-economic class.

ETHICAL CONSIDERATION

Ethical approval was obtained from the Ethical Review Board of Bowen University Teaching Hospital, Ogbomoshos Nigeria (NHREC/12/04/2022; BUTH/REC-675) and permission to conduct the study was obtained from the College Provost. All ethical principles were strictly maintained in conducting the study; written consents/assents were obtained, confidentiality and anonymity were preserved and there was voluntariness in participation.

RESULTS

Table 1 shows that almost half (49.0%) of the respondents were adolescents aged 15-19 years and their mean age was 20 ± 6.91 . The majority (93.8%) of the respondents were Christians, more than three-quarters (79.8%) were of the Yoruba ethnic group, and 98.0% were never married. A higher percentage (34.5%) of the participants were in the Public Health program. More than half (56.8%) of the respondents were in years 1-3 of their studies, while 98.8% had never been pregnant before the survey. The mean age at menarche was 12 ± 1.51 years, and 49.8% of respondents were in the high socio-economic class. Thirty-four (8.5%) of the respondents had a family history of breast cancer. In Table 2, almost all (98.8%) of the respondents had heard of breast cancer. The majority (92.9%) of them agreed that family history is a risk factor for breast cancer development, but only 27.8% recognized the use of oral contraceptive pills as a risk factor, while 23.3% believed that breast cancer development is a spiritual attack.

Breast lump was considered a symptom of breast cancer in 98.0% of instances, but 11.0% of the respondents considered sagging of the breast a symptom of the disease. The majority (83.3% and 75.2%) of the respondents identified BSE and mammography as means of detecting breast cancer. Only 1.2% of the respondents believed they could

be at risk of breast cancer. Overall, 70.0% of respondents had good knowledge of breast cancer, while 82.3% had a positive attitude toward breast cancer screening.

Table 3 shows that only 28.8% of the respondents had ever screened for breast cancer. Mean age at first screening was 17 ± 2.2 years and 89.6% had their first screening before the age of 19 years. While 14.8% had their screening within a month, 55.6% had theirs within a year prior to the survey. The most common reason for screening was just to know one's status, reported by 61.8% of the respondents. Persistent pain in the breast was mentioned by 13.0% of screening utilizers as their main reason. BSE was the most common screening method, used by 69.6% of those who had ever screened. A Clinical Breast Examination (CBE) has been conducted for 33.9% of screening users, while 6.1% have had Mammography. Instructions on the conduct of BSE were usually received from healthcare workers (82.5% of respondents), but 50.0% learned the procedure online, with only 5.2% learning from their mothers. Most respondents (65.8%) believed BSE should be performed at least once a month, while 26.0% believed it should be performed daily. Most (92.8%) of the respondents agreed that all adult women should perform BSE. The main reasons for lack of breast cancer screening in the study setting were low-risk perception (37.5%), and lack of awareness of how and where to screen for breast cancer (30.9%), but 7.4% of the respondents could not screen due to lack of funds (Figure 1).

Respondents in the 20-24-year category had a significantly higher proportion (40.2%) who had ever screened than younger respondents ($p=0.001$). Also, medical students had a significantly higher percentage (34.2%) of those who had gone for screening ($p=0.001$). Respondents with at least 4 years at the university had a significantly higher proportion (39.3%) who had ever been screened, compared with students with fewer years at the university ($p=0.001$). Respondents with a family history of breast cancer had a significantly higher proportion (55.9%) of those who had screened for the disease ($p=0.012$). The percentage of breast cancer screening users (31.0%) was significantly higher among those with a negative attitude

Table 3: Breast Cancer Screening among The Respondents

Variables	Frequency N=400	Percentage
Ever screened for breast cancer		
Yes	115	28.8
No	285	71.2
Age at first screening	n = 115	
≤19	103	89.6
≥ 20	12	10.4
Mean ± SD	17 ± 2.2	
Time of last screening	n=115	
Within the past one month	17	14.8
Within the past three month	34	29.6
Within the past I year	64	55.6
Reason for screening		
Family history of breast cancer	2	1.7
Persistent pains in the breast	15	13.0
Unusual breast discharge	4	3.5
Advise by health worker	23	20.0
To know one's status	71	61.8
Screening method used*		
Breast self-examination	80	69.6
Clinical breast examination	39	33.9
Breast ultrasound	22	19.1
Mammography	7	6.1
Fine needle aspiration cytology	4	3.5
Educator on Breast self-examination*	n = 80	
Health worker	66	82.5
Online	58	72.5
A friend	4	5.0
Mother	6	7.5
Ideal frequency of Breast self-examination	n = 400	
At least once every month	263	65.8
Everyday	104	26.0
Once a year	33	8.2
Ideal time for carrying out Breast self-examination		
Before menstruation	138	34.5
During menstruation	52	13.0
After menstruation	191	47.8
Before sex	5	1.3
After sex	5	1.3
Anytime	9	2.1
Those believed to be in need of breast cancer screening		
Only sexually active ladies	3	0.8
Ladies who hardly have sex	1	0.3
Only ladies with family history of breast cancer	5	1.3
Pregnant ladies	3	0.8
All ladies	371	92.8
Don't know	17	4.0

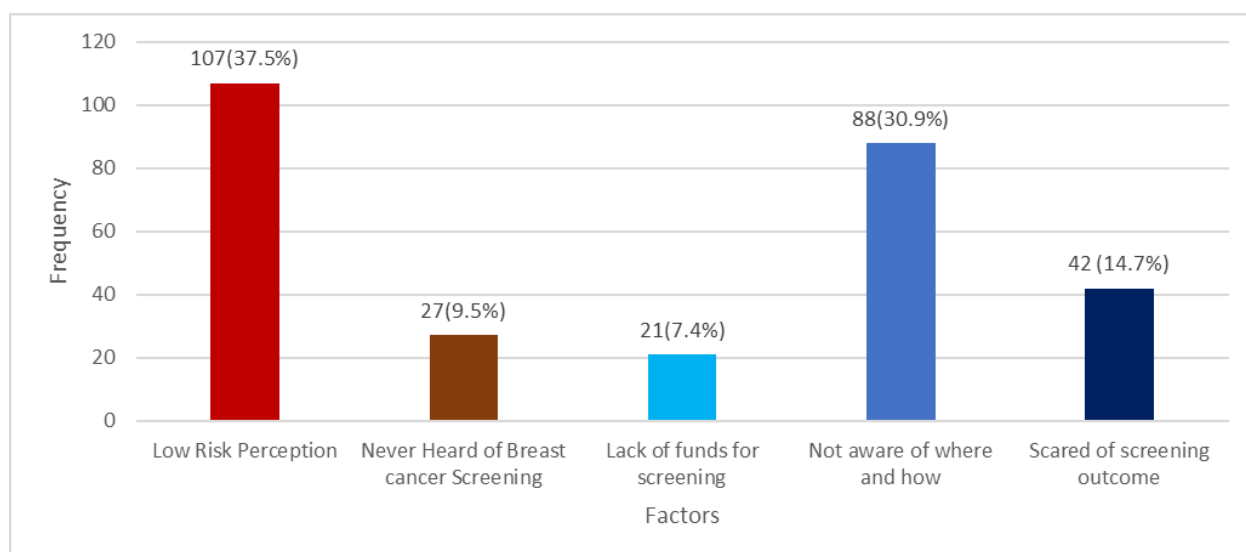


Figure 1: Reasons Respondents Did Not Perform BSE as Screening Procedure for Breast Cancer

($p=0.032$) (Table 4).

Table 5 reveals that respondents who were between 15-19 years of age were 70% less likely to have screened for breast cancer compared to older students (AOR=0.30; 95%CI=0.186-0.475).

Likewise, respondents who had spent 1-3 years in the university were 58% less likely to have screened for breast cancer when compared to their seniors (AOR=0.42; 95%CI=0.266-0.646).

Respondents without family history were 71.0% less likely to have done breast cancer screening with BSE, when compared to those with family history (AOR=0.29; 95%CI=0.140-0.585). Respondents with a positive attitude toward screening were 2 times more likely to have undergone breast cancer screening than those with a negative attitude (AOR=2.1; 95% CI=1.075-3.909).

DISCUSSION

The study examined respondents' risk perception, awareness, knowledge, breast cancer screening practices, and the determinants of these practices at a privately owned tertiary institution in Nigeria. Almost all the respondents had heard of breast cancer, and most of them had good knowledge of the disease. Past studies also indicate a high level of awareness and knowledge of Nigerians about breast cancer. A systematic review shows that there is a high level of awareness of breast cancer in the general Nigerian population.¹⁴ Specifically, a study

revealed that almost all the undergraduate students in a Nigerian tertiary institution were aware of breast cancer, while another study reported that about three-fifths of female undergraduates in Osun State had good knowledge of the disease.^{16,17} However, a study reported that 90.3% of undergraduate students of a tertiary institution in Abeokuta, Southwest Nigeria, had poor knowledge of breast cancer.¹⁸ The fact that respondents in the current study were in health-related disciplines may explain the higher knowledge score recorded, as they had greater exposure to breast cancer-related information through didactic lectures from their tutors, compared with the Abeokuta study, which was conducted in a non-health-related institution. The majority of respondents in the current study rightly knew that family history is a risk factor of breast cancer, but slightly above one-quarter (27.8%) of them recognized the use of oral contraceptive pills as a risk factor, while almost a quarter of them believed that breast cancer development is a spiritual attack. A study in Turkey revealed that knowledge of undergraduate students about risk factors of breast cancer was low.¹⁹ Some past studies also reveal some level of misconception regarding risk factors of breast cancer. A study revealed that some Nigerian women attribute breast cancer causation to "Evil Arrow".²⁰ This belief system may have serious public health implications, as people who have the

belief that their conditions have spiritual undertones will most likely not want to seek help from qualified health professionals early enough, to prevent serious complications from setting in before medical assistance can be rendered. Hence, there is a need for relevant stakeholders to intensify awareness campaigns regarding breast cancer and its risk factors among undergraduate students in Nigeria. Courses highlighting risk factors and prevention of common non-communicable diseases such as cancers, obesity, diabetes, cardiovascular diseases, and dyslipidemia should be introduced into national university curricula, as these diseases are now occurring at epidemic proportions in Nigeria. The majority (83.3% and 75.2%) of the respondents correctly identified BSE and mammography as means of detecting breast cancer. These findings agree with reports from previous studies suggesting that Nigerian students are aware of BSE and mammography for breast cancer screening. A Nigerian study revealed that majority of students interviewed identified BSE and mammogram as screening methods for breast cancer.¹⁷ Also, a systematic review revealed that BSE and mammogram were the most popularly known breast cancer screening methods amongst Nigerian students.²¹

Although the level of awareness of Nigerian students is high regarding BSE, there is a need for sustained enlightenment on how BSE can be correctly done to increase its sensitivity and specificity among young girls. Furthermore, female undergraduate students should be adequately educated on the need for clinical evaluations when lumps are detected during BSE, no matter the size of the lump. Additionally, programmers can leverage the high digital knowledge of the undergraduate students in Nigeria to disseminate relevant cancer prevention and screening information using the available social media platforms, including YouTube, Facebook, blogs, Twitter (now X), WhatsApp, and others. Female celebrity figures and social media influencers can also be engaged to promote breast cancer screening practices among Nigerian youths. The myth that people without family history are not at risk of breast cancer should be dispelled, as low risk perception was one of the main reasons for the lack of breast cancer screening among respondents in

the current study. Young women need to be aware that just being a woman is a risk factor for developing breast cancer, as only 1.2% of our respondents believed they could be at risk.

Most respondents in the current study had a positive attitude toward screening. This finding agrees with reports from past studies.^{18,21,22} Stakeholders can leverage on this positive attitude of Nigerian students towards breast cancer screening to create one-stop shops within tertiary institutions where female students can easily access quality information on female cancers (not limited to breast cancer) and their screening procedures. Services should be rendered free or at affordable prices, as some participants in the current study reported not knowing where to screen, while others cited lack of funds as their reason for non-screening. In spite of the good knowledge and positive attitude, just slightly above one-quarter of the respondents in the current study had ever screened for breast cancer, but BSE was the most prevalent method used by the respondents. Our findings are consistent with reports from previous studies.^{11,18} Even though routine mammography investigation is not recommended nor affordable for young undergraduate women who are mostly dependent on their parents for daily sustenance, there is a need to further sensitize them on the need for a monthly BSE and occasional CBE (usually annual). Breast ultrasonography can also be used for breast cancer screening among female adults who are less than forty years old.

Determinants of screening practices in the current study included respondents' age, length of stay in school, positive family history and attitude to breast cancer screening. Past studies had identified some of these factors as predictors of breast cancer screening practice among undergraduate students.^{11,23} Longer length of stay in school, as identified in the current study, signifies higher chances of students being exposed to breast cancer-related information. Also, a positive attitude has been described as a potent predictor of future health behavior and practice.²⁴ Hence, there is a need to leverage the positive attitude among our respondents to make breast cancer information and screening services available, accessible, and affordable to the Nigerian students.

Table 4: Factors Associated with Breast Cancer Screening among Respondents

Variable	Ever screened for breast cancer		Total	χ^2	p-value
	Yes = 115 (%)	No= 285 (%)			
Age group				26.627	0.001*
15 – 19	33 (16.8)	163 (83.2)	196		
20 – 24	82 (40.2)	122 (59.8)	204		
Religion				3.262	0.196
Christianity	107 (28.5)	268 (71.5)	375		
Islam	8 (40.0)	12 (60.0)	20		
Traditional	0 (0.0)	5 (100.0)	5		
Ethnicity				1.227	0.747
Yoruba	95 (29.8)	224 (70.2)	319		
Hausa	2 (33.3)	4 (66.7)	6		
Igbo	8 (26.7)	22 (73.3)	30		
Others (Urhobo, Idoma, Edo, Igala)	10 (22.2)	35 (77.8)	45		
Marital status				1.521	0.468
Never married	113 (28.8)	279 (71.2)	392		
Married	2 (40.0)	3 (60.0)	5		
Course of study				26.379	0.001*
Nursing	6 (18.2)	27 (81.8)	33		
Anatomy	4 (33.3)	8 (66.7)	12		
Medical laboratory science	2 (11.1)	16 (88.9)	18		
Physiology	8 (30.8)	18 (69.2)	26		
Public health science	34 (24.6)	104 (75.4)	138		
MBBS	25 (34.2)	48 (65.8)	73		
Physiotherapy	15 (21.1)	56 (78.9)	71		
Others	2 (6.9)	27 (93.1)	29		
Years in school (Class level)				16.584	0.001*
1 – 3	47 (20.7)	180 (79.3)	227		
4 – 7	68 (39.3)	105 (60.7)	173		
Age at menarche				3.509	0.173
≤ 10	10 (20.4)	39 (79.6)	49		
11 – 15	101 (29.4)	242 (70.6)	343		
≥ 16	4 (50.0)	4 (50.0)	8		
Socio-economic status				15.308	0.053
High	41 (20.8)	156 (79.2)	197		
Middle	65 (35.9)	116 (64.1)	181		
Low	9 (52.9)	8 (47.1)	17		
Family history of breast cancer				13.354	0.001*
Yes	19 (55.9)	15 (44.1)	34		
No	96 (26.2)	270 (73.8)	366		
Overall knowledge score				9.755	0.008
Poor	0 (0.0)	15 (100.0)	15		
Fair	24 (22.9)	81 (77.1)	105		
Good	91 (32.5)	189 (67.5)	280		
Attitude to breast cancer screening				4.593	0.032*
Positive	102 (31.0)	227 (69.0)	329		
Negative	13 (18.3)	58 (81.7)	71		

*Statistically significant at $p < 0.05$

Table 5: Determinants of Breast Cancer Screening Uptakes by the Respondents

Variable	Ever screened for breast cancer Yes = 115 No= 285 (%) (%)		χ^2	β	p-value	AOR	95 % C I
Age group							
15 – 19	33 (16.8)	163 (83.2)	26.63	-1.212	0.001*	0.30	0.186 – 0.475
20 – 24 ^{RC}	82 (40.2)	122 (59.8)	16.58				
Years in school (Class level)							
1 – 3	47 (20.7)	180 (79.3)	18.91	-0.880	0.001*	0.42	0.266 – 0.646
4 – 7 ^{RC}	68 (39.3)	105 (60.7)					
Mother's education							
No formal education	7 (100.0)	0 (0.0)	16.56	0.345	0.187	0.20	0.561-8.672
Secondary education ^{RC}	9 (37.5)	15 (62.5)					
Tertiary education	99 (26.8)	270 (73.2)	15.308	0.474	0.279	1.61	0.681 – 3.788
Socio-economic status							
High	41 (20.8)	156 (79.2)	13.354	-1.454	0.006*	0.23	0.085 – 1.643
Middle	65 (35.9)	116 (64.1)	11.598	-0.697	0.172	0.50	0.183 – 1.353
Low ^{RC}	9 (52.9)	8 (47.1)					
Family history of breast cancer							
Yes ^{RC}	19 (55.9)	15 (44.1)					
No	96 (26.2)	270 (73.8)	9.755	-1.252	0.001*	0.29	0.140 – 0.585
Attitude to breast cancer screening							
Positive	102 (31.0)	227 (69.0)	4.593	0.718	0.029*	2.10	1.075 – 3.909
Negative ^{RC}	13 (18.3)	58 (81.7)					

***Statistically significant at p<0.05, AOR=Adjusted Odds Ratio, CI=Confidence Interval, RC=Reference Category**

This study may have been affected by social desirability bias, in which participants might have provided answers they considered desirable to the researchers but may not accurately represent their actual practices. However, respondents were encouraged to be truthful in their answers, as the confidentiality of all information they provided was assured before each interview. The fact that the research was conducted at a single college could have reduced its external validity, but the potential design

effect was accounted for during sample size estimation to improve the generalizability of the study's findings. This study provides baseline data that can be used by policymakers to design and implement cost-effective breast cancer prevention programs for young women across various Nigerian tertiary institutions.

CONCLUSION

Awareness of breast cancer risk factors and screening was high in the study setting. However, breast cancer

screening practice was low despite the high knowledge score of respondents and their positive attitude toward screening. Low risk perception was the main reason for the lack of breast cancer screening uptake. Consequently, there is a need for a well-designed breast cancer awareness program on various campuses in Nigeria to dispel the myths regarding risk perceptions and to improve uptake of breast cancer screening programs among female students.

DATA AND MATERIAL AVAILABILITY

Data and other research materials are available upon a reasonable request from the authors.

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AUTHORS' CONTRIBUTIONS

AFA contributed to the research conceptualization, study methodology, data management and analysis, and drafting of the manuscript. AI supervised the research work, contributed to the research conceptualization, study methodology, data management and analysis, and drafting of the manuscript. Both authors revised the manuscript for the intellectual content.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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