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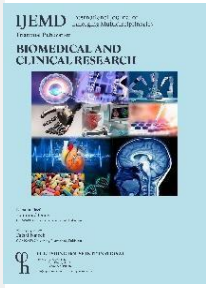

Knowledge of Breast Cancer Risk Factors and Screening Practices Among Female Patients at ATBUTH Bauchi

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Abstract

Breast cancer is a global public health problem and is currently the second leading cause of cancers word wide and the most commonly diagnosed cancer among women with 2.3 million new cases (11.6%) reported in 2022. There are low survival rates for breast cancer among women in West Africa due to late presentation.

This was a cross-sectional, descriptive survey conducted among two hundred and twenty-five (225) female patients at ATBUTH Bauchi. A structured questionnaire was used to assess the level of knowledge of breast cancer risk factors and utilization of breast cancer screening measures among respondents. Data was exported and analyzed using IBM SPSS version 24.

Most of the study respondents (92.9%) have heard of breast cancer and most of them know that older women (73.4%), having a family member with breast cancer (62.7%) and lack of breastfeeding (59.1%) increases a woman's risk. Few respondents (40.9%) practice monthly BSE. Less than half of study respondents (42.7%) have had CBE before and very few (7.6%) have had mammography before. Most of the respondents have heard of breast cancer and are aware of some of the risk factors for breast cancer. However, there's low utilization of breast cancer screening methods.

Keywords: *BSE; CBE; Mammography; Risk factors.*

1. Introduction

Breast cancer is a disease of global public health concern as it affects millions of women worldwide; studies have reported breast cancer to be a leading cause of morbidity and mortality among all cancers affecting women across the globe. Breast cancer was reported to be the second leading cause of cancers among women across the globe, with 2.3 million new cases (11.6%) reported by the Global Cancer Observatory (GLOBOCAN) in 2022. Breast cancer is now reported to be the fourth leading cause of cancer deaths worldwide with 666,000 deaths (6.9%) in 2022. It is important to note that among women, breast cancer is the most commonly diagnosed cancer and the leading cause of cancer deaths[1].

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Women with breast cancer in Sub-Saharan Africa (SSA) such as Nigeria have been reported to have low survival rates. The low survival rates for breast cancer among women in this region have been linked to late presentation to health care facilities and often with advanced disease, lack of access to healthcare facilities, paucity of trained personnel among others. One out of every three breast cancer deaths in this region is reported to be preventable by increasing awareness about breast cancer among women, providing and equipping health care facilities and training health care workers on early diagnosis and appropriate treatment for breast cancer in order to improve patients survival[2,3].

Breast cancer can be detected early among women with the disease by employing screening measures such as breast self-examination (BSE), clinical breast examination (CBE), and mammography. BSE can be performed by women in the comfort of their homes, while CBE is performed by trained healthcare workers. Mammography requires the use of specialized equipment which may only be available in some tertiary healthcare facilities[4,5].

The risk factors for breast cancer are multi-factorial, but the following factors have been implicated in the initiation and progression of breast cancer, increasing age, use of hormone replacement therapy (HRT), consumption of high amounts of dietary fat, excessive alcohol intake, cigarette smoking, family history of breast cancer especially among a first degree relative, among others[6–8].

The incidence of breast cancer has been steadily increasing in SSA, breast cancer is now reported to be the highest cause of cancer among women in many parts of Africa. The incidence of breast cancer in Nigeria has increased by more than 5% per year between the 1990s and mid 2010s[9,10]. The incidence of breast cancer in Nigeria was reported to be 54 per 100,000 in 2010, which was a 100% increase when compared to the preceding decade[11].

Available studies on the knowledge of breast cancer risk factors have reported low levels among women interviewed, although many of them have heard of breast cancer. The lack of knowledge of risk factors for breast cancer means that women don’t know what predisposes them to an increased risk of developing breast cancer and so will not take necessary measures to screen themselves for breast cancer. The lack of awareness leads to late presentation, often with advanced disease which contributes to the poorer prognosis of breast cancer seen in this region[12,13].

Female breast cancer incidence is rising among women in developing countries, they are also disproportionately affected by breast cancer and are reported to have higher morbidity and mortality rates than women in developed countries. The higher morbidity and mortality rates have been attributed largely to late presentation and lack of access to healthcare. Therefore, in order to improve survival, it is important to improve awareness of breast cancer risk factors and breast cancer screening measures to promote early detection [3,14,15]. No similar study was found to have reported on the knowledge of breast cancer screening practices and risk factors among women in northeast Nigeria. This study will therefore contribute to the knowledge on this topic.

2. Methodology

This was conducted among 225 female patients aged 18 – 60 years visiting the surgical outpatient department of Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH). The study aimed to assess patients' knowledge of breast cancer risk factors and breast cancer screening practices among patients seen at the surgery outpatient department of Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH) Bauchi.

Research questions

This research set out to answer the following questions:

1. Are patients aware of the risk factors for breast cancer? If yes, what is their level of awareness?
2. What is the level of knowledge of breast cancer screening practices?
3. What is the level of utilization of the different screening practices?
4. Are there any associations between knowledge of breast cancer risk factors and utilization of screening methods and practice?

Eligibility Criteria

The following criteria were used to recruit participants into the study.
Inclusion Criteria:

- Female clinic attendees.
- Those between 18 - 60 years of age.
- Patients who consented to participate in the study.

Exclusion Criteria

- Male patients.
- Female patients under 18 years or over 60 years of age.
- Patients who did not consent to participate in the study.

Study Design

This study was implemented as a cross-sectional, descriptive, quantitative survey that focused on female patients who attended the Surgery Outpatient Department of Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH) Bauchi. Primary data was collected from clinic attendees who met the inclusion criteria and consented to partaking in the study.

Sample Size Determination

The sample size was determined using Cochran's sample size determination formula, which is appropriate for estimating the minimum sample size in descriptive health studies[16]:

$n = Z^2pq / (d)^2$

Where:

n = desired sample size,
z = 1.96 (at 95% confidence limit), p = proportion of

occurrence, q= proportion of non-occurrence (1-p= 0.95),

d= margin of error (0.03).

$n = (1.96)^2$ x (0.05) (0.95) / (0.03)2, n = 3.8416 x

0.05 x 0.95 / 0.0009, n = 0.1825 / 0.0009, n =

202.75, i.e., approximately 203.

To account for possible non-response and attrition bias in this study, 10% was added to the sample size to arrive at a total sample of 223. A total of 225 participants were recruited for this study.

Sampling Technique

Simple random sampling without replacement was done among the weekly list of clinic attendees during the period of data collection, and consenting patients were included until the desired sample size was reached.

Study Instrument

Primary data was collected from clinic attendees using a structured, pre-tested, interview-aided questionnaire hosted on Google forms. The questionnaires were administered by the researcher and research assistants, which included some nurses and doctors using their smartphones or computers. A small section of patients who had smartphones were able to scan the QR-code, which opens the questionnaire on their smartphones, which they can fill at their convenience.
The questionnaire was divided into sections, the first collected data on sociodemographic characteristics of research participants, the second section collected data regarding respondents' knowledge of breast cancer risk factors while the last section was concerned with the knowledge and practice of breast cancer screening practices among study respondents.

Data Management and Analysis

The data collected was checked for errors, sorted, and coded before it was analyzed using Statistical Product and Service Solutions (SPSS) version 24. The sociodemographic characteristics of study respondents were collected including their age, highest level of education, marital status and occupation. Data concerning patient's knowledge of breast cancer risk factors like increasing age, high fatty diet, early menarche, late menopause, oral contraceptive pill use, nulliparity and lack of breastfeeding was collected. Data concerning knowledge and utilization of breast cancer screening practices like BSE, CBE and mammography were also collected. The data was then extracted and entered into Microsoft Excel 2019 then exported and analyzed; the results are presented below.

3. Results

Descriptive analysis of the data collected was done; measures of central tendency were calculated including the mean, median and mode of the age of study participants. The frequencies and percentages of the other socio-demographic characteristics, breast cancer risk factors and breast cancer screening practices were also presented.
Knowledge scores were determined by assigning one point to each knowledge of breast cancer risk factor and the respondents were classified into those who have good knowledge and those who had poor knowledge. Chi square test was done to determine the level of association between knowledge of breast cancer risk factors and sociodemographic characteristics, and breast cancer screening practices.

Socio-Demographic Characteristics

The ages of study respondents, their educational status, marital status and occupation are as presented in table 1 below.

Table 1: Socio-demographic characteristics of study respondents

Characteristic	Frequency (n=225)	Percent (%)
Age (years)		
18 – 24	38	16.9
25 – 31	70	31.1
32 – 38	50	22.2
39 – 45	21	9.3
46 – 52	21	9.3
53 – 60	25	11.2
Total	225	100.0
Mean ± SD	34.68 ± 11.159	
Highest level of education		
No formal education	34	15.1
Primary	7	3.1
Secondary	59	26.2
Tertiary	125	55.6
Total	225	100.0
Marital status Single	65	28.9
Married	133	59.1
Divorced	7	3.1
Widowed	20	8.9
Total	225	100.0
Occupation		
Businesswoman	37	16.5
Civil servant	68	30.2
Farmer	12	5.3
Housewife	70	31.1
Student	38	16.9
Total	225	100.0

SD – standard deviation

Those aged 25 - 31 had the most respondents with 70/225 (31.1%). The mode was 25 years with a median age of 32 years and mean age of 34 years. The study respondents were aged between 18 and 60 years with a range of 42 and standard deviation (SD) of 11. Those with tertiary level of education were the highest with 125/225 respondents (55.6%) and those with primary level of education were the least among the respondents with 7/225 respondents (3.1%). Regarding their occupation, civil servants were 68/225 respondents (30.2), which was a close second to housewives with 70/225 respondents (31.1%).

Knowledge Of Breast Cancer Risk Factors

The second part of the questionnaire asked questions to assess the knowledge of breast cancer risk factors among the study respondents and the results are presented in table 2 below.

Table 2: Knowledge of breast cancer risk factors among study participants

Characteristic	Frequency (n=225)	Percent (%)
Have you heard of breast cancer before		
Yes	209	92.9
No	16	7.1
Total	225	100.0
Older women are more at risk of having breast cancer		
Yes	165	73.4
No	19	8.4
I don't know	41	18.2
Total	225	100.0
Having a family member with breast cancer increases a woman's risk		
Yes	141	62.7
No	20	8.9
I don't know	64	28.4
Total	225	100.0
Having a lot of fatty foods increases a woman's risk		
Yes	46	20.5
No	48	21.3
I don't know	131	58.2
Total	225	100.0
Starting menstruation early and stopping late increases a woman's risk		
Yes	48	21.3
No	49	21.8
I don't know	128	56.9
Total	225	100.0
Using oral contraceptive pills increases a woman's risk		
Yes	105	46.7
No	29	12.9
I don't know	91	40.4
Total	225	100.0
Not bearing children increases a woman's risk		
Yes	91	40.4
No	38	16.9
I don't know	96	42.7
Total	225	100.0
Lack of breastfeeding increases a woman's risk		
Yes	133	59.1
No	23	10.2

I don't know	69	30.7
Total	225	100.0

Most of the respondents 209/225 (92.9%) have heard of breast cancer before. Most of them 165/225 respondents (73.4%) agreed that older women were more at risk, 141/225 respondents (62.7%) agreed that having a family member with breast cancer increases a woman's risk of having breast cancer and 133/225 (59.1%) agreed that lack of breast feeding also increases a woman's risk of developing breast cancer. However, most of them 131/225 (58.2%) did not know that having a lot of fatty foods increases a woman's risk. Similarly, majority of respondents 128/225 (56.9%) said early menarche and late menopause did not increase a woman's risk of developing breast cancer.

Knowledge And Utilization Of Breast Cancer Screening Practices

The third section of the questionnaire asked questions to assess the knowledge of breast cancer screening practices and their uptake among the study respondents and the results are presented in table 3 below.

Table 3: Knowledge and utilization of breast cancer screening practices among respondents.

Characteristic	Frequency (n=225)	Percent (%)
Have you heard of BSE before?		
Yes	145	64.4
No	80	35.6
Total	225	100.0
Have you performed BSE before?		
Yes	144	64.0
No	81	36.0
Total	225	100.0
How often do you perform BSE?		
Daily	18	8.0
Weekly	42	18.7
Monthly	92	40.9
Never	73	32.4
Total	225	100.0
Is regular BSE useful in detecting breast cancer?		
Yes	131	58.3
No	12	5.3

I don't know	82	36.4
Total	225	100.0
Have you heard of CBE before?		
Yes	120	53.3
No	105	46.7
Total	225	100.0
Have you had CBE done before?		
Yes	96	42.7
No	129	57.3
Total	225	100.0
Is CBE useful in detecting breast cancer?		
Yes	182	80.9
No	6	2.7
I don't know	37	16.4
Total	225	100.0
Have you heard of mammography before?		
Yes	73	32.4
No	152	67.6
Total	225	100.0
Have you had mammography done before?		
Yes	17	7.6
No	208	92.4
Total	225	100.0
Is mammography useful in detecting breast cancer?		
Yes	121	53.7
No	6	2.7
I don't know	98	43.6
Total	225	100.0
How often should mammography be performed?		
Yearly	38	16.8

Every two years	35	15.6
I don't know	152	67.6
Total	225	100.0

As shown in table 3 above, majority of the respondents 145/225 (64.4%) had heard of BSE before, majority of respondents 144/225 (64%) had performed BSE before. However, only 92/225 respondents (40.9%) performed monthly BSE.
Majority of the study respondents 120/225 (53.3%) had heard of CBE before but only 96/225 respondents (42.7%) had CBE done before. Majority of study respondents 182/225 (80.9%) agreed that CBE was useful in detecting breast cancer.
Concerning mammography, majority of study respondents 152/225 (67.6%) had not heard of it, only 17/225 respondents (7.6%) had done mammography before, and 121/225 respondents (53.7%) agreed that mammography was useful in detecting breast cancer.

Factors Associated With Knowledge Of Breast Cancer Risk Factors

The knowledge of breast cancer risk factors among study respondents was scored by allocating a mark of 1 to correct answers and 0 to wrong answers, this was summed up for all respondents. The scores were then dichotomized into those who had good knowledge of breast cancer risk factors and those who had poor knowledge. This was then cross tabulated against the socio-demographic characteristics of study participants and the utilization of breast cancer screening practices to test for any associations, as shown in table 4 below.

Table 4: Factors associated with knowledge of breast cancer risk factors

Variable	Good knowledge	Poor knowledge	Chi square value	df	P-value
Socio-demographic characteristics					
Highest level of education					
No formal education	4	30	50.064	3	0.000*
Primary	0	7			
Secondary	14	45			
Tertiary	80	45			
Marital status					
Single	27	38	2.111	3	0.550
Married	62	71			
Divorced	3	4			
Widowed	6	14			
Occupation					
Business woman	19	17	46.564	5	0.000*
Civil servant	50	18			
Farmer	3	9			
Housewife	14	56			
Student	12	27			

* Statistically significant (*P*-value < 0.05)

Good knowledge of risk factors of breast cancer was found to have a statistically significant association with highest level of education ($X^2 = 50.064$, df = 3, $p = 0.000$) and occupation ($X^2 = 46.564$, df = 5, $p = 0.000$).

Association Between Knowledge And Utilization Of Breast Cancer Screening Practices

The knowledge of breast cancer risk factors among study respondents was also scored and dichotomized into those who had good knowledge of breast cancer risk factors and those who had poor knowledge as described above. This was then cross tabulated against the utilization of breast cancer screening practices to test for any associations as displayed in table 5 below.

Table 5: Association between Knowledge and utilization of breast cancer screening practices

Variable	Good knowledge	Poor knowledge	Chi square value	df	P-value
Breast cancer screening practices					
Have you performed BSE before?					
Yes	93	51	71.942	1	0.000*
No	5	76			
Have you had CBE done?					
Yes	47	49	1.988	1	0.159
No	51	78			
Have you done mammography before?					
Yes	13	4	8.104	1	0.004*
No	85	123			

* Statistically significant (*P*-value < 0.05)

Good knowledge of breast cancer risk factors was also found to have a statistically significant association with practice of BSE ($X^2 = 71.942$, df = 1, $p = 0.000$) and also with performing mammography ($X^2 = 8.104$, df = 1, $p = 0.004$).

4. Discussion

This study set out to evaluate the knowledge of breast cancer risk factors among outpatients visiting ATBUTH Bauchi, the knowledge of breast cancer screening practices and the utilization of those breast cancer screening practices among patients visiting ATBUTH Bauchi. This study also aimed to assess if there are any relationships between knowledge of breast cancer risk factors and the utilization of breast cancer screening practices among the patients.

Majority of the study respondents 55.6% had tertiary education, similar to 45.7% reported by Azubuike and Onuoha in their study among women in northwest Nigeria[17]. The high proportion of study respondents with tertiary level of education may have contributed to most of the study respondents (92.9%) having heard about breast cancer. This study also had a high number of civil servants (30.2%),

businesswomen (16.5%) and students (16.9%) among the respondents, all of whom tend to be educated and knowledgeable about breast cancer. Azubuike and Onuoha also found that those who had tertiary education and had professional occupations had better knowledge of breast cancer[17].

Most of this study's respondents (73.4%) agreed that older women were more at risk of developing breast cancer, which is much higher than 32.6 % reported among women in northwest Nigeria. Most of the study respondents (62.7%) were aware that having a family member with breast cancer increases a woman's risk of having breast cancer, which is better than 35% which was reported among females in a tertiary institution in southwest Nigeria and 44.8% reported among women in northwest Nigeria. This is important because women with a first degree relative such as mother, sister or daughter with breast cancer are at an increased risk of developing breast cancer[17,18].

Many of the study respondents (46.7%) agreed that using oral contraceptive pills increases a woman's risk of developing breast cancer, this is higher than reported by Omotara and Yahya in their study among rural women in northeast Nigeria, probably due to differences in education and occupational exposures as mentioned above[17,19]. Majority of the study respondents (64.4%) have heard about BSE and had performed it before (64%), however only 40.9% performed BSE monthly. This finding is higher than the 48.9% reported among rural women in northeast Nigeria, but less than 100% reported among female health care professionals in Lagos. Another study among female health workers in Nnewi also reported higher rates of awareness of BSE (98.8%) and practice of BSE (81.9%)[19–21]. These higher rates of awareness and practice of BSE are expected among healthcare workers who are no doubt well aware of the disease condition and are expected to enlighten others about it.

A scoping review of BSE in Nigeria reported an average knowledge of BSE at 67%, practice of 40%, and monthly BSE of 26% across studies done in Nigeria. This study reports a similar level of awareness of BSE (64.4%), higher rates of practicing BSE (64%) and monthly BSE (40.9%) respectively[17,22].
Most of the study respondents (53.3%) were aware of CBE, however, it was lower than reported by [28] (79.4%) among female tertiary healthcare workers in Nnewi. Many of the study respondents (42.7%) have had CBE before; this is similar to 47.2% reported among semi-urban and rural women in Oshogbo. This is much higher than 6.5% reported by Olugbenga et al in their study among women in a tertiary institution within the same state [18,21,23] .This may be due to some educational differences between the study groups as one was conducted among rural women and the other among females in a tertiary institution.

Most of the study respondents (67.6%) have never heard of mammography, in contrast to the study by [28] who reported that 90% of study respondents were aware of mammography and 86% of them knew it could be used for early detection of breast cancer, also higher than what was found in this study (53.7%)[21]. Their study was however conducted among female healthcare workers who are more familiar with the disease and the methods of screening.
Only 7.6% of the study respondents had done mammography before, this is similar to 8% reported by Nasir et al in their study among female healthcare professionals in a tertiary healthcare center in Lagos but much higher than 1% reported by Olugbenga in their study among females in a tertiary institution in southwest Nigeria and 3.1% reported by Akhigbe and Omuemu among female healthcare workers in Benin [18,20,24]. This is in contrast to the higher rates seen in other countries like Saudi Arabia (42.7%) and Singapore (35%). Other authors have also reported lower rates of mammography in developing countries with women in advanced countries reporting higher rates of mammography[18,20,25,26]. Some barriers to use of mammography in our region may include the high cost of the procedure and the availability of the facilities for mammography in resource poor settings like Nigeria.

In this study good knowledge of breast cancer risk factors was found to have a statistically significant association with the level of education ($P = 0.000$) and occupation ($P = 0.000$) of study respondents. Other studies also reported an association between practice of BSE with level of education and occupation[9,17, 22, 27, 28, 29].

Similarly, good knowledge of breast cancer risk factors was found to have a statistically significant association with practice of BSE ($P = 0.000$) and mammography ($P = 0.004$) in this study. Other studies also reported similar associations between knowledge of breast cancer and the different screening methods with their utilization [21,22,29,30].

Strengths and Limitations

This study has added to the body of knowledge on breast cancer screening practices among women in northeast Nigeria. It also reports on the level of knowledge of breast cancer risk factors among patients presenting to a tertiary healthcare center in northeast Nigeria and further explores the association between the knowledge of breast cancer risk factors and utilization of breast cancer screening practices among the study respondents.

Some of the research assistants encountered language barrier while administering the questionnaires among study respondents. This was overcome by pairing them with others who understand the local Hausa language.

5. Conclusion

The study aimed to evaluate the knowledge of breast cancer risk factors among patients, to assess the knowledge of breast cancer screening practices among the patients and to assess for any associations between the knowledge of breast cancer risk factors and the utilization of breast cancer screening practices.

The study reports that most of the patients (92.9%) had heard about breast cancer but they mostly have a fair knowledge of the risk factors for breast cancer and low levels of utilization of breast cancer screening practices with only 7% of respondents who have had mammography in the past.

The study also found a statistically significant relationship between knowledge of breast cancer risk factors and utilization of breast cancer screening measures like BSE and mammography. SSA countries are among those with the highest mortality from breast cancer; hence the need for preventive measures like educating women on the risk factors and encouraging screening for early detection and appropriate treatment to improve outcomes.

Recommendations

In view of the above findings from this study, the following recommendations are made for future research, practice and policy:

(i) Government-backed national breast cancer screening programs should be adopted to reduce the cost to patients and enable routine screening mammography for women 40 years and above.
(ii) Establishment of breast imaging units in tertiary healthcare facilities and include facilities for screening mammography for early detection of breast lesions.
(iii) Culturally specific and sensitive health education should be developed on the risk factors of breast cancer and breast cancer screening methods to enlighten women in the community on the need for early detection of breast cancer.
(iv) Women should be encouraged to go for breast cancer screening at primary, secondary or tertiary health facilities.

(v) Women should be taught how to properly perform monthly BSE, to effectively detect any abnormal changes in the breast, as it is a cheap way of screening.
(vi) Further studies can be conducted to identify other factors affecting the utilization of breast cancer screening measures.

Abbreviations

ATBU – Abubakar Tafawa Balewa University; ATBUTH – Abubakar Tafawa Balewa University Teaching Hospital; BSE – breast self-examination; CBE – clinical breast examination; GLOBOCAN – global cancer observatory; HRT – hormone replacement therapy; QR – quick response; SD – standard deviation; SSA – sub–Saharan Africa ; SPSS – statistical product and service solutions.

Acknowledgements/Declaration

Ethical Considerations

Joint ethical clearance was obtained from the ABU, Zaria Research Committee and the ATBUTH Research and Ethical committee before the commencement of this study. Study participants were also required to give their consent to participate in this study.

Author Contributions

MMM conceptualized and designed the study together with OAO and ASG. MMM and ASG sorted and analyzed the data. MMM wrote the manuscript, OAO and ASG critically reviewed it. All authors approved the final draft of the manuscript.

Competing Interests

The authors declare no competing interests.

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References

[1] Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 2024;74(3):229–63.
[2] Olayide AS, Halimat AJ, Samuel OA, Ganiyu RA, Soliu OA. Level of Awareness and Knowledge of Breast Cancer in Nigeria. A Systematic Review. Ethiop. J. Health Sci.2017;27(2):163–74.
[3] Joko-Fru WY, Jedy-Agba E, Korir A, Ogunbiyi O, Dzamalala CP,
[4] Chokunonga E, et al. The evolving epidemic of breast cancer in sub-Saharan Africa: Results from the African Cancer Registry Network. Int J cancer [Internet] 2020 [cited 2022 Jun 7];147(8):2131–41. Available from: https://pubmed.ncbi.nlm.nih.gov/32306390/
[5] Olowokere E. Breast cancer knowledge and screening practices among women in selected rural communities of Nigeria. J Public Heal Epidemiol 2012;4(9):238–45.
[6] Ren W, Chen M, Qiao Y, Zhao F. Global guidelines for breast cancer screening: A systematic review. Breast 2022;64(March):85–99.

[7] Akhigbe AO, Omuemu VO. Knowledge, attitudes and practice of breast cancer screening among female health workers in a Nigerian urban city. BMC Cancer [Internet] 2009 [cited 2022 Nov 2];9:203. Available from:
[8] /pmc/articles/PMC2709903/
[9] C A, HN M. The Etiology of Breast Cancer [Internet]. In: Breast Cancer. Brisbane (AU): Exon Publications; 2022. Available from:
[10] https://europepmc.org/article/nbk/nbk583809
[11] Daly A, Rolph R, Cutress R, Copson E. A Review of Modifiable Risk Factors in Young Women for the Prevention of Breast Cancer. Breast Cancer Targets Ther 2021;13:241–57.
[12] Onwere S, Okoro O, Chigbu B, Kamanu C. Breast self-examination as a method of early detection of breast cancer: Knowledge and practice among antenatal clinic attendees in south eastern nigeria. 2014 [cited 2022 Nov 20];Available from: www.pjms.com.pk
[13] Sung, Hyuna; Ferlay, Jacques; Siegel, Rebecca; Soerjomataram, Isabelle; Jemal, Ahmedin; Bray F. Globocan 2020.Pdf. CA Cancer J Clin [Internet]
[14] 2021;71. Available from: chrome-
[15] extension://dagcmkpagjlhakfdhnbomgmjdpkdklff/enhancedreader.html?openApp&pdf=https%3A%2F%2Facsjournals.onlinelibrary.wiley.com%2Fdoi%2Fpdfdirect%2F10.3322%2Fcaac.21660
[16] Elizabeth Oladimeji K, Tsoka-Gwegweni JM, Igbodekwe FC, Twomey M,
[17] Akolo C, Sabuwa Balarabe H, et al. Knowledge and Beliefs of Breast SelfExamination and Breast Cancer among Market Women in Ibadan, South West, Nigeria. 2015 [cited 2022 Oct 30];Available from: www.cchrad.org.
[18] Saulawa H, Auwal F, Danjuma N. Knowledge and Awareness of Breast Cancer Risk Factors and Screening Methods Amongst Undergraduate Pharmacy Students of Ahmadu Bello University Zaria, Nigeria. Nig J Pharm Res 2022;18(1):55–62.
[19] Udo S, Ene F, Ikechukwu A, Gamde S, Yetunde E, Ogundipe A, et al. Knowledge and Associated Risk Factors of Breast Cancer among Females in Karu Local Government Area , Nasarawa State , Nigeria. J Appl Sci Environ Manag 2024;28(8):2545–9.
[20] Obaji NC, Elom H A, Agwu UM, Nwigwe CG, Ezeonu PO, Umeora O U J. Awareness and Practice of Breast Self-Examination among Market Women in Abakaliki, South East Nigeria. Ann Med Health Sci Res [Internet] 2013;3(1):7–12. Available from: www.amhsr.org
[21] Omoyeni OM, Oluwafeyikemi PE. Assessment of the Knowledge and Practice of Breast Self Examination among Female Cleaners in Obafemi Awolowo University Ile Ife , Nigeria. Int J Caring Sci 2014;7(1):239–51.
[22] Bluman A. Elementary Statistics: A step by step approach. 9e ed. McGraw Hill; 2014.
[23] Azubuike SO, Onuoha Celestina U. Breast cancer: The perspective of northern Nigerian women. Int J Prev Med [Internet] 2015 [cited 2022 Oct 31];2015-
[24] Decem(130). Available from: www.ijpvmjournal.net
[25] Olugbenga-Bello A, Oladele EA, Bello TO, Ojo JO, Oguntola AS. Awareness and breast cancer risk factors: perception and screening practices among females in a tertiary institution in Southwest Nigeria. Niger Postgrad Med J 2011;18(1):8–15.
[26] Omotara B, Yahya S. Awareness, Attitude and Practice of Rural Women regarding Breast Cancer in Northeast Nigeria. J Community Med Health Educ 2012;2(5):2–5.
[27] Ibrahim NA, Odusanya OO. Knowledge of risk factors, beliefs and practices of female healthcare professionals towards breast cancer in a tertiary institution in Lagos, Nigeria. BMC Cancer 2009;9:1–8.

[28] Madubogwu CI, Egwuonwu AO, Madubogwu NU, Njelita IA. Breast cancer screening practices amongst female tertiary health worker in Nnewi. J Cancer Res Ther 2017;13(2):268–75.
[29] Muhammed MM, Ncube F, Oloko NL. A Scoping Review of the Knowledge and Practice of Breast Self-Examination among Women in Nigeria. Int J Emerg Multidiscip Biomed Clin Res 2024;2(1):1–18.
[30] Olayide AS, Isiaka A, Ganiyu R, Samuel O, Akande H, Olalekan O, et al. Breast cancer treatment and outcome in Nigeria: A Systematic Review and Meta-analysis. Asian Pacific J Cancer Prev 2023;8(3):591–8.
[31] Akhigbe AO, Omuemu VO. Knowledge, attitudes and practice of breast cancer screening among female health workers in a Nigerian urban city. BMC Cancer 2009;9.
[32] Abdel Hadi MSA. Breast cancer awareness among health professionals. Ann Saudi Med 2000;20(2):135–6.
[33] Seah M, Tan SM. Am I breast cancer smart? Assessing breast cancer knowledge among healthcare professionals. Singapore Med J 2007;48(2):158–
[34] 62.
[35] Sani A, Naab F, Aziato L. Influence of educational level on knowledge and practice of breast self-examination among women in Sokoto, Nigeria. J Basic Clin Reprod Sci 2016;5(2):100.
[36] Bellgam HI, Buowari YD, State R, Medical C, Woji N. Knowledge , Attitude and Practice of Breast Self Examination among Women in Rivers State , Nigeria. 2012;12(1):12–4.
[37] Adegbenro C.A, Ajala A.M, Ajayi O.O , Ajayi T.D, Ajayi O.E, Ajewole A.O OAO. Awareness of Breast Cancer and Practice of Breast Self-Examination among Rural Women in Ife-North Local Government Area, Osun State, SouthWest Nigeria. J Community Med Prim Heal Care 2014;26(1):76–87.
[38] Dahlui M, Gan DEH, Taib NA, Pritam R, Lim J. Predictors of breast cancer screening uptake: A pre intervention community survey in Malaysia. Asian Pacific J Cancer Prev 2012;13(7):3443–9.