# Breast Sonography: A Review of the indications and findings in Oghara, Nigeria

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## Abstract

**Background**: Breast sonography is the first line imaging tool for evaluating the symptoms and signs of breast disease. Different symptoms of breast disease will warrant the referral for a breast sonogram. Breast sonography is particularly useful as an imaging tool for young women with "mammographically" dense breast as the sensitivity of mammography for detection of breast cancer is reduced for such age groups. This study aims to review the indications for breast sonography and the pattern of sonographic diagnosis of breast lesions seen in Radiology Department, Delta State University Teaching Hospital, Oghara over a period of 5 years.
**Methods**: The Radiology request forms and breast ultrasound scan reports of patients who presented to the Radiology department from 2012 to 2016 were retrieved and studied
**Results:** A total of 240 patients with a mean age of 36.34 ±15.3 were examined during the study period. Females formed 95.2% of the study population while males were 4.8%. The patients were referred for breast sonogram due to varying complaints of lump or mass, pain and nipple discharge etc. Breast mass was the commonest complaint of 183 (68.0%) patients while the commonest provisional and radiological diagnosis of the patients who presented with breast lumps was fibroadenoma which was seen in 65 (27.1%) of the patients. Only one (0.4%) patient was referred for screening.
**Conclusion:** Lumps in the breast are common symptoms in women warranting referral for breast sonography which should be the first line investigative imaging tool for various complaints of breast diseases in young women.

**Key words:** Breast, lump, sonography, mammographically dense

## Introduction

Breast sonography is usually the first line imaging tool for evaluating the symptoms and signs of breast disease basically because of its affordability, availability and accessibility. Furthermore, it is an imaging modality that does not utilize ionizing radiation as the breast is a radio sensitive organ.[1] It is carried out with a probe / transducer of high frequency ( usually 7.5MHz and above) because the breast is a superficial organ. The glandular and fibrous tissues, muscles, and vascular structures of the breast have characteristic sonographic anatomy.[1,2] Differentiation of cystic from solid breast lesions as well as characterizing breast masses are among the advantages of sonography.[3] Different breast lesions have characteristic sonographic features that can be used to classify them into benign or malignant masses. However, the major limitation of sonography is the known fact that it is highly operator and machine dependent; and requires training of users for it to be utilized optimally for the best interest of the patient.

Breast sonography as well as mammography is useful in assessing the parenchymal density of the breast. Depending on the age of the woman, the breast density is comprised of varying proportion of connective and glandular tissue. The breast of the young woman which is composed of a higher proportion of glandular tissue is dense. Dense breast parenchyma is the predominant sonographic breast pattern found in a selected population of Nigerian women.[4] Such young women with "mammographically" dense breast will not benefit from mammography as the sensitivity of mammography for detection of breast cancer is reduced in this group of women.[5] Breast sonography is the complementary imaging tool to mammography, especially for women with dense breast parenchymal pattern who have increased risk for breast cancer.[6-8] The multidisciplinary team in the management of breast disease comprises a spectrum of breast experts from different disciplines that work together to provide optimal care for the patient. The radiologist in the team utilizes sonography and the other imaging tools of the breast such as mammography and magnetic resonance imaging which are necessary as part of the multidisciplinary team approach to the management of women with complaints of breast disease.

Breast symptoms are of great concern to women and physicians alike, this is due to the increasing global incidence and changing pattern of the epidemiology of breast cancer. In African studies, breast cancer has been reported in younger women.[9-13] A high frequency of

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malignant lesions has been reported in the 30-39 year age group of a population of Nigerian women in Calabar, implying that the presentation of malignant breast disease is a decade earlier compared to women in Europe and North America.[14]

A wide spectrum of symptoms and diseases are known to affect the breast. Complaints of the breast such as a mass/ lump, pain, nipple discharge and swelling among others are common generally.[12,14] A palpable mass or lump in the breast is most commonly a cancer scare until physical breast examination, imaging and histological evaluation are done to evaluate or exclude it. Different breast lesions have characteristic sonographic features that can be used to classify them into benign or malignant masses. Sonographically, fibroadenomas are usually characteristically well-defined solitary or multiple lesions, with homogeneous echogenicity in comparison with the surrounding glandular tissue and have posterior acoustic enhancement.[1]

The role of imaging is to confirm a provisional diagnosis made by the referring physician or to make a radiologic diagnosis, stage cancers and also carry out interventional procedures such as image guided biopsies.[3,6] Of the imaging investigations for the breast, sonography or ultrasound scan is usually the first line, especially for younger women because of the density of their glandular breast tissue.

This study aimed at examining the spectrum of symptoms of breast disease that necessitated the referrals for breast sonography at the Delta State University Teaching Hospital (DELSUTH) Oghara, and also to document the sonographic diagnoses of breast diseases among a Nigerian population. It is hoped that the findings of this study will reveal the level of utilization of breast sonography in our environment, possibly buttress its important role in the management of breast diseases and assist in the advocacy for improvement of screening practices of breast cancer.

## Methods
This was a descriptive cross sectional review of the records of patients who were referred to the Radiology Department of the Delta State University Teaching Hospital, Oghara for breast ultrasound scan between 2012 and 2016. Ethical approval for the study protocol was obtained from the hospital ethics and research committee before the commencement of the study. Permission to access the records (radiology request forms) of the patients was granted by the hospital management. The hospital has standardized radiology request forms which are designed to capture information such as the biodata, the presenting complaints, clinical question to be answered, provisional diagnosis and details of the referring doctor. The hospital is also equipped with the Radiology Information System (RIS) in which all the radiology reports of the patients are archived with the picture archiving and communications system (PACS).

The breast scans were done by the radiologists using the departmental standard operating procedure (SOP) for breast scans which entails that as the patient comes into the department for a breast sonogram, the request form is cross-checked and the patient properly identified. The patient is then taken into the ultrasound room, where she changes into a hospital gown and then lies supine on the examination couch with the hands behind the head. The radiologist uses a 7.5MHz transducer to scan both breasts and axillae in longitudinal and transverse planes systematically in a clockwise direction. Sonogram images are frozen, labeled and printed out. The coupling gel is cleaned off and patient is informed of the findings. The sonogram reports are typed into the hospital PACS/RIS systems, and this is printed and given to the patient. The scans were performed using a Toshiba Xario ultrasound machine (Japan).

Data extracted from the request forms which included age, sex, presenting complaints, differential diagnosis and radiological diagnosis were entered into the data spreadsheet and analyzed with Statistical Package for Social Sciences (SPSS) version 21.

## Results
Two hundred and forty patients of different ages were referred for breast scan during the review period on account of varying breast complaints.

Table 1: Demographics of the patients in the study.

| Variables | Categories | Frequency (%) |
|---|---|---|
| Sex | Male | 11 (4.6) |
| | Female | 229 (95.4) |
| Age (years) | Mean | 36.34 ±15.3 |
| | <30 | 87 (36.3) |
| | 30-39 | 72 (30.0) |
| | 40-49 | 37 (15.4) |
| | ≥50 | 44 (18.3) |
| Total | | 240 (100.0) |

Table 1 summarizes the demographic features of the patients that were referred for breast sonogram during the period reviewed. Most of the patients scanned were females (95.4%). The mean age of the patients in the study was 36.34± 15.3 with majority of the patients in the less than 30 years and 30-39 age groups.

Table 2: The symptoms of the patients referred for the breast scans

| Symptoms | Frequency (%) |
|---|---|
| Mass/ lump | 183 (68.0) |
| Pain | 57 (21.1) |
| Nipple discharge | 12(4.5) |
| Breast swelling | 11 (4.1) |
| Breast scar | 1 (0.4) |
| Swelling of right upper limb | 1 (0.4) |
| Infected mastectomy wound | 1 (0.4) |
| Difficulty in breathing | 1 (0.4) |
| Routine check | 1(0.4) |
| Not indicated | 1 (0.4) |
| *Total | 269 (100.0) |

*The figures denote the total number of the symptoms, not the number of patients

Table 2 shows the symptoms of the patients referred for the breast scans. Breast mass or lump was the commonest (68.0%) symptom followed by pain which 57 (21. 1%) of the patients presented with. Some patients were referred with more than one symptom.
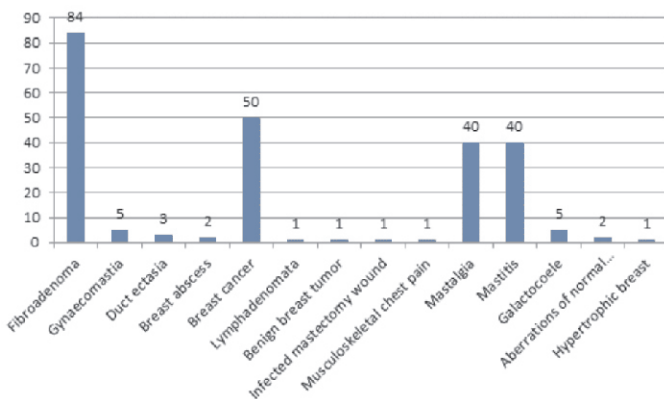


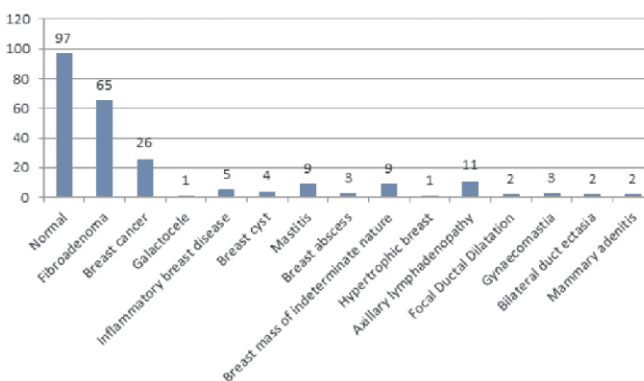Figure 1: Provisional diagnosis by the referring clinician of the patients referred for breast scans.



Figure 2: Radiological diagnosis of the patients referred for breast scans.

Figures 1 and 2 display the array of the provisional

diagnoses made by the referring clinicians and the radiologic diagnoses made by the radiologist respectively. The commonest provisional diagnosis was fibroadenoma followed by breast cancer. Most of the patients (97; 40.4 %) referred for breast scan had normal ultrasound scan findings.

**Discussion**

The mean age of 36.34 ±15.3 years of the women in this study is similar to the finding of 35.67 (± 12.89) years reported by Olarinoye-Akorede et al in Zaira[15] as well as other studies that reported that breast lesions were commonly seen from the third decade of life.[9-16] However, a higher mean age of 41.7± 11.34 years was reported by Omidiji et al[17] in Lagos, Nigeria. Almost two-third of the patients who utilized breast sonography during the period under review were less than 40 years of age. Ikpeme et al[14] reported 50% of their study population being less than 38 years. This is not surprising, considering the young age of the study population who will preferentially be referred for breast ultrasound scan which is sensitive for this age group.[14] Similarly, the study of Vercauteren et al[8] in the Netherlands also corroborate the higher utilization of sonography among younger women. Furthermore, sonography is more readily available, affordable and accessible.

Breast lump/mass as a symptom of breast disease which warranted the referral for breast sonography in this study was seen in four-fifths (68.0%) of the 183 women seen in this study (Table 2). This supports findings from other studies in Zaria (Nigeria)[15] and Kampala (Uganda)[13] respectively that found that breast lump is the commonest reason for referral for sonography. However, screening was the commonest reason in Calabar[14] while breast pain which is the second common presentation in this study, was the commonest presentation in both Lagos and Enugu.[17,18]

Of the patients who presented with breast mass/ lump, fibroadenoma was the commonest provisional and radiological diagnosis made by both the referring clinician and radiologist. Fibroadenoma is the commonest cause of a breast lump in females less than 35 years old.[1] Malik et al[4] also reported fibroadenoma as the commonest lesion (43 out of 56) in a similar study in which ultrasonography was utilized to evaluate breast lumps. Surgeons and pathologists have also reported fibroadenoma as the highest occurring breast lesion.[10,14,19-23] Ultrasonography is able to differentiate benign and malignant lesions based on characteristic features.[4,13,24]

In this study, the breast lesions of 10.8% of patients were radiologically diagnosed as breast cancer. In a similar study in Calabar, 7% of malignant lesions are reported by Ikpeme et al[14] in the 30-39 year age group of a population of Nigerian women. The rising incidence of

breast cancer among young women which is particularly worrisome is multifactorial and has been linked to genetics, environmental, diet, chemical toxins, radiation among others.[25,26] The presentation of malignant breast disease has been observed to be a decade earlier in Nigerian women compared to women in Europe and North America.[14] In another study of 100 patients with breast lesions in Lagos, (Nigeria), Irurhe et al[28] compared ultrasound and histopathologic findings and reported a high sensitivity (100%) and specificity (96.6%) of breast ultrasonography in the diagnosis of breast lesions.

Only one (0.4%) patient had breast sonography for screening in this study. This is a sharp variation from the study of Ikeme in Calabar who reported that screening was the main indication for breast sonography in the majority (26.8%) of the patients that utilized breast sonography.[14] Also at variance to our study is the comparative higher proportion (4.8% ) of the women who utilized breast sonography for the purpose of screening in a study in Zaria, Nigeria.[15] Imaging of the breast which can either be for screening or diagnostic purposes is carried out using imaging tools such as sonography/ultrasonography, mammography and magnetic resonance imaging (MRI). Screening for breast cancer is done for asymptomatic women with no complaints, the sole aim of which is to possibly detect any existent lesion that is not yet diagnosed or a lump that is not yet palpable.[4,17,28-30] Poor level of awareness of the value of breast sonography may be responsible for its low utilization in young women in our locality. There is a need to create more awareness among young women to embrace breast sonography in addition to self-breast exam and clinical breast exam as screening methods until they attain the age of 40 which is the age at which they can commence regular or annual screening mammography. Studies have reported similar low uptake of mammographic screening especially in developing countries; deterrents being culture, religion, poor knowledge, cost and non-availability of mammographic machines.[31-32]

Majority of the patients seen in this study were females. Needless to say that disease of the breast commonly affects females although the male breast is not spared. Public health awareness needs to be intensified by individuals, groups and the government in educating women and men about breast diseases so as to encourage early presentation thereby reducing the morbidity and mortality associated with malignant breast lesions.

Normal findings were reported in almost half of the patients. A comparable value was also found in other studies in Nigeria that utilized breast sonography[15] and mammography.[33-36] Conversely, a higher percentage of abnormality (27%) was detected using ultrasound compared to mammography in a group of symptomatic women with breast masses in Uganda.[37] The high number of normal findings in this study may be attributed to the wide spectrum of presenting complaints of the patients who were referred for sonogram and may be also be due to an improved health seeking attitude of women in relation to breast complaints. Women need to be more conscious than ever in seeking early and appropriate medical attention and should be encouraged in this as it is indeed "better to err on the side of caution." There is also need to improve the utilization of breast sonography as a screening tool for breast disease in young women who are less than 40 year because of their breast parenchyma density which does not favor the use of mammography.

The limitation of this study is that it did not correlate the radiological diagnosis of the breast lesions with histopathological findings; hopefully, this will be done in future studies so as to buttress the sensitivity and predictive value of ultrasonography in this environment.

**Conclusion:** Lumps in the breast are common symptoms in women warranting referral for breast sonography which should be the first line investigative imaging tool for various complaints of breast diseases in young women.

**References**
1. Michael J. Michel. The Breast. In: David Sutton, ed. Textbook of Radiology and Imaging. Vol 2 . 7th ed. Philadelphia. Churchill Livingstone.; 2004: 1455-14468
2. Ryan S, McNicholas M, Eustace S. Anatomy for diagnostic imaging, 2nd ed. Philadelphia: Saunders; 2004: 307-310.
3. Harvey JA. Sonography of palpable breast masses. Semin Ultrasound CT MR. 2006;27:284-97
4. Obajimi MO, Adeniji-Sofoluwe AT, Adedokun BO, Soyemi TO, Bassey OS. Sonographic breast pattern in women in Ibadan, Nigeria. Ann Afr Med 2014;13:145-50.
5. Malik G, Wagar F, Buledi GQ. Sonomammography for evaluation of solid breast masses in young patients. J Ayub Med Coll Abbottabad. 2006; 18:34-7.
6. Basset LW, Kimee-Smith C. Breast sonography. AJR Am J Roentgenol. 1991;156:449-55.
7. Boyd NF, Guo H, Martin LJ, Sun L, Stone J, Fishell E, et al. Mammographic density and the risk and detection of breast cancer. N Engl J Med. 2007;356:227-36.
8. Vercauteren LDB, Kessels AGH, van der Weijden T, et al. Clinical impact of the use of additional ultrasonography in diagnostic breast imaging. Eur

Radiol.2008; 18: 2076–2084. Doi 10.1007/s00330-008-0983-0

9. Clegg-Lamptey J, Hodasi W. A study of breast cancer in Korle Bu Teaching Hospital: Assessing the impact of health education. Ghana Med J. 2007;41:72-7.

10. Irabor DO, Okolo CA. Outcome of one hundred and forty nine consecutive breast biopsies in Ibadan, Nigeria. Breast Dis. 2011;33:109-14.

11. Nzegwu MA, Anyikam A, Ozumba BC, Ugochukwu AI, Agu KA. Malignant breast lesions in Eastern Nigeria. Saudi Med J. 2008;29:778-80.

12. Nggada HA, Gali BM, Bakari AA, Yawe-Terna EH, Tahir, MB, Apari E, Dahiru AB, Yawe K-D T. The spectrum of female breast diseases among Nigerian population in Sahel climatic zone. Journal of Medicine and Medical Sciences. 2011: 2(10); 1157-1161.

13. Gonzaga MA. How accurate is ultrasound in evaluating palpable breast masses? Pan Afr Med J. 2010;7:1. Epub 2010 Sep 2. PMID: 21918690; PMCID: PMC3172638.

14. Ikpeme A, Akintomide A, Inah G, Oku A. Breast Evaluation Findings in Calabar, Nigeria. Maced J Med Sci. 2014:15; 2(4):650-654.

15. Olarinoye-Akorede SA, Aliyu H, Yunusa HG. Pattern of breast ultrasound findings in Zaria, North Western Nigeria. Arch Int Surg. 2018;8:54-8

16. Njeze GE. Breast lumps: A 21-year single center clinical and histological analysis. Niger J Surg. 2014;20:38-41.

17. Omidiji OA, Campbell PC, Irurhe NK, Atalabi OM, Toyobo OO. Breast cancer screening in a resource poor country: Ultrasound versus mammography. Ghana Med J. 2017;51:6-12.

18. Okere P, Aderigbibe A, Iloanusi N, Olusina DB, Itanyi D, Okoye I. An audit of the first three years of mammography and sono-mammography at the University of Nigeria Teaching Hospital, Enugu, Nigeria. J Coll Med. 2012;17:2:38-47

19. Olu-Eddo AN, Ugiagbe EE. Benign breast lesions in an African population: A 25-year histopathological review of 1864 cases. Niger Med J. 2011;52:211-6.

20. Amr SS, Sa'di AR, Ilahi F, Sheik SS. The spectrum of breast disease in Saudi Arab females: A 26-year pathological survey at Dhahram health centre. Ann Saudi Med. 1995;15:125-32.

21. Oluwole SF, Freeman HP. Analysis of benign breast lesions in blacks. Am J Surg 1979;137:786-9.

22. Ochicha O, Edino ST, Mohammed AZ, Umar AB, Atanda AT. Benign breast lesions in Kano. Nig J Surg Res. 2002;4:1-5.

23. Anyikam A, Nzegwu MA, Ozumba BC, Okoye I, Olusina DB. Benign breast lesions in Eastern Nigeria. Saudi Med J. 2008;29:241-4.

24. Sravros AT, Thickman D, Rapp CL, Dennis MA, Parker SH, Sisney GA. Use of USG to differentiate benign and malignant masses. Radiology. 1995;196:123-34

25. Gray JM, Rasanayagam S, Engel, C et al. State of the evidence 2017: an update on the connection between breast cancer and the environment. Environ Health.2017:16: 94. http://doi.org/10.1186/s12940-017-0287-4

26. Ohayon JL, Nost E, Silk K, Rakoff M. Brody JG. Barriers and opportunities for breast cancer organizations to focus on environmental health and disease prevention: a mixed-methods approach using website analyses, interviews, and focus groups. Environ Health. 2020: 19 : 15. doi:10. 1186/s12940-020-0570-7

27. Irurhe NK, Adekola OO, Awosanya GOG, Adeyomoye AO, Olowoyeye OA, Awolola NA et al. The accuracy of ultrasonography in the diagnosis of breast pathology in symptomatic women. Nig. Qt. J. Hosp. Med; 2012; 22:236-239.

28. Berg WA. Rationale for a trial of screening breast ultrasound: American College of Radiology Imaging Network(ACRIN) 6666. AJR Am J Roentgenol. 2003;180:1225-8

29. Houssami N, Irwig L, Simpson JM, et al. Sydney Breast Imaging Accuracy study: Comparative Sensitivity and specificity of mammography and Sonographic in young more with symptoms. AJR Am J Roentgenol. 2003; 180:935-40.

30. Flobbe K, Bosch AM, Kessels AG, et al. The additional diagnostic value of ultrasonography in the diagnosis of breast cancer. Arch Intern Med. 2003; 163:1194

31. Oche MO, Ayodele SO, Umar AS. "Breast Cancer and Mammography: Current Knowledge, Attitudes and Practices of Female Health Workers in a Tertiary Health Institution in Northern Nigeria. Public Health Research. 2012:2 (5);114-119. doi: 10.5923/j.phr.20120205.01.

32. Olasehinde O, Alaise OI, Arowolo OA, Mango VL, Olajide OS, Omisore AD, Boutin- Foster C, Kingham TP. Barriers to mammography screening in Nigeria: A survey of two communities with different access to screening facilities. Eur J Cancer Care (Engl). 201928(2):e12986. doi: 10.1111/ecc. 12986. Epub 2019 Jan 6.

33. Umeh EO, Umeh KF, Ebubedike UR, Ezeugbor CF, Anene CN. Mammogram history in Nigerian women: Age-related risk factors for breast cancer and educational implications. S. Afr. J. Oncol. 2018;2(0), a45. https://doi. org/10.4102/sajo. v2i0.45