detection is reduced in mammographically dense breast which is a reflection of the amount of radiographic dense epithelium and stroma in the breast. In older women on hormone replacement therapy (HRT) or other medications and younger ones with naturally dense breast, ultrasound is useful in diagnosing breast lesions. There are various documentations on findings in breast cancer screening programmes, mostly from countries with established screening programmes with relatively scanty reports from developing countries. Increased awareness of breast cancer and recent establishment of breast imaging units has led to high turnout of patients. Generally, benign breast diseases are commoner than their malignant counterpart worldwide. This premier study documents our findings and analysis using the ACR-BIRADS.

MATERIALS AND METHODS

The hospital ethics and research requirements were met before commencing this prospective study which was carried out among all consecutive patients that came for screening and diagnostic mammography in the breast imaging unit of our institution during a 5-year period, January 2009-December 2013.
The patients were made to complete a self-administered questionnaire on getting to the breast imaging unit with or without a request form. This contained basic bio data information like age, sex, occupation, level of education; reproductive history such as age of menarche, menopause, first childbirth, parity and use of oral contraceptives; family history of breast cancer and other medical history. For patients that came in for follow up imaging during the period of study, the latest findings were used for the study. Data from these were collated and analysed using social statistical package (SPSS) version 17.

Mammography was routinely done as the first line of investigation in women 40 years and above and ultrasound scan in those with equivocal mammographic findings. The film-screen mammograms were acquired with a General Electric (GE) Senographe DMR machine using two standard views (cranio-caudal (CC) and mediolateral oblique (MLO) and additional views such as spot compression magnification view; cleavage view and exaggerated CC view where necessary. Breast ultrasound scan was done using an Aloka Prosound SSD-350 + ultrasound machine equipped with linear and curvilinear 7.5-10 MHz transducer in longitudinal, transverse, radial and anti-radial planes.

The mammograms were evaluated by two trained radiologists under well lit viewing box and mammographic breast density pattern and findings assigned and categorized using BIRADS classification method. The density classifications are: BIRADS 1: Breast almost entirely fatty; BIRADS 2: Scattered fibroglandular pattern; BIRADS 3: Heterogeneous dense pattern and BIRADS 4: Homogenous dense pattern. The assessment categories of findings are as follows: BIRADS 0: Inconclusive study; BIRADS 1: Normal study, BIRADS 2: Benign findings, BIRADS 3: Probably benign findings; BIRADS 4: Suspicious lesion, BIRADS 5: Highly suspicious lesion and BIRADS 6: Known biopsy.

### RESULTS

The mammograms of 824 patients were evaluated during this study period. Their age ranged from 40-85 years with a mean age of 50.9 ± 8.1 years. The 40-49 age groups constituted the largest group (48.2%) with the least in the 80-90 groups (0.5%) [Table 1]. Eight hundred and sixteen (99%) were females and eight (1%) were males.

Of these patients, three hundred and ninety four (47.8%) came for routine screening, 52.1% had clinical indication and one patient (0.1%) had no documented clinical indication. Table 2 shows the frequency of the various clinical indications. The commonest clinical indication was breast lump (23.9%), closely followed by breast pain (19.4%) and just one patient with breast abscess (0.1%). These findings were slightly commoner on the right side; also four of the five cases of known cancer had their tumors on the right side. Fifty (6.1%) and 38 (4.6%) patients had history of mastectomy and lumpectomy respectively. There was positive history of breast cancer in first degree relatives in 46 (5.6%) patients including one of those with known cancer. In a patient with known cancer as the clinical indication, the cancer was already fungating hence mammography of the unaffected breast alone was done and re-categorized based on our finding.

Mammographic density patterns were classified in the 816 females as shown in Table 3.

This showed that the ACR-BIRADS 2 (scattered fibroglandular pattern) had the highest frequency of 43.9%, followed by the fatty replaced pattern with 38.2%, then heterogeneous dense with 16.4% and least proportion was extremely dense pattern with 0.5%.

Mammograms were normal in 266 (32.3%) of the study population while 558 (67.7%) showed positive findings, Table 4. Of the positive findings, circumscribed opacity with regular margin were 371 in number, constituting 66.5% of the positive findings, this included opacity seen within breast parenchyma and axillary region irrespective of their sizes. Opacity with irregular, angular or speculated margin accounted for (53) 16.7%. Calcifications of various patterns.

| Table 1: Age distribution of patients |
|--------------------------------------|
| Age distribution (Years) | Frequency | Percentage |
|--------------------------|-----------|------------|
| 40-49                    | 397       | 48.2       |
| 50-59                    | 299       | 36.3       |
| 60-69                    | 101       | 12.2       |
| 70-79                    | 23        | 2.8        |
| 80-90                    | 4         | 0.5        |
| Total                    | 824       | 100        |

| Table 2: Clinical indication distribution pattern |
|-----------------------------------------------|
| Clinical indication | Number of patients (Frequency) | Percentage |
|---------------------|-------------------------------|------------|
| Breast lump         | 197                           | 23.9       |
| Breast swelling     | 21                            | 2.6        |
| Breast pain         | 160                           | 19.4       |
| Breast abscess      | 1                             | 0.1        |
| Axillary swelling   | 10                            | 1.2        |
| Nipple discharge    | 35                            | 4.3        |
| Known cancer        | 5                             | 0.6        |
| Routine screening   | 394                           | 47.9       |
| No indication       | 1                             | 0.1        |

| Table 3: Distribution of mammographic density pattern |
|------------------------------------------------------|
| Density pattern | Frequency | Percentage |
|-----------------|-----------|------------|
| BIRADS 1 (Predominantly fatty) | 315 | 38.2 |
| BIRADS 2 (Scattered fibroglandular) | 362 | 43.9 |
| BIRADS 3 (Heterogeneous dense) | 135 | 16.4 |
| BIRADS 4 (Homogenous dense) | 4 | 0.5 |
| Total            | 816       | 99         |
types were seen in 149 (17.8%), of these, 80.3% were benign looking and 19.7% suspicious. Areas of focal glandular asymmetry were noted in twenty-eight (5%) mammograms while tubular shaped, soft tissue opacity mainly in the retroareola region were seen in eighteen (3.2%) mammograms. Two (0.4%) of the male patients had diffuse increase in breast tissue without a focal opacity. Some patients however had combination of findings.

The final BIRADS assessment distribution is as shown in Table 5. Inconclusive study (BIRADS 0), Normal study (BIRADS 1), Benign findings (BIRADS 2), Probably Benign findings (BIRADS 3), Suspicious findings (BIRADS 4), Highly suspicious findings (BIRADS 5) and Known Cancer (BIRADS 6) constituted 6.6%, 30.1%, 29.7%, 22.2%, 5.9%, 5.0% and 0.5% respectively.

**DISCUSSION**

Imaging of the breast is assuming a vital role in the management of breast disease and breast cancer screening. Mammography has established its role in this direction. However, modifications like graduation from screen film mammography to digital mammography; contrast enhanced spectral mammography, breast tomosynthesis have evolved. Automated breast ultrasound scan, shear wave elastography are evolving. Magnetic resonance imaging (MRI) is also assuming a prominent role in breast imaging. Other modalities include computed tomography (CT), scintimammography, positron emission mammography (PEM) and single photon emission computed tomography (SPECT). In our centre, the film-screen mammography and conventional breast ultrasound are the available modalities used in this study.

The largest proportion of women in this study that had mammography was the 40-49 year age group which tallies with the commonest group from previous studies. Baseline mammography is usually started by the fifth decade of life and the increased health awareness and enthusiasm at this stage could probably explain this high percentage. Breast disease includes all non-malignant and malignant conditions of the breast, including lumps, swelling, trauma, mastalgia, mastitis, and nipple discharge. Breast lump accounted for the highest clinical indication for diagnostic mammography closely followed by breast pain. In some studies done locally, breast lumps has been shown to be the most prevalent clinical presentation and highest indication for diagnostic mammography. Mammographic breast density pattern is a reflection of the relative proportion of radiolucent fat to the radiodense glandular epithelium and connective tissue. It is a known independent risk factor for developing breast cancer and can be used to predict who will develop breast cancer.

The most prevalent breast density pattern in this study is the scattered fibroglandular pattern (ACR-BIRADS 2) which accounted for 43.9%. This finding is similar to that of Akinola et al., and Pak et al., but at variance with Obajimi et al., whose study showed BIRADS 1 as the most prevalent breast pattern. The high risk breast density pattern, BIRADS 3 and 4 constituted a total of 16.9% and this is relatively lower than those from previous studies presumably due to the higher mean age of this study population as breast density pattern is known to be inversely proportional to age. These categories of breast density pattern have a lower sensitivity to mammography as an imaging tool as cancers can easily be obscured by the dense breast. It is worthy to mention here that of the BIRADS 4 breast pattern patients, one had previous left mastectomy and then presented with right breast swelling and after imaging, her final ultrasound and mammogram BIRADS assessment category was 5 (highly suspicious lesion) based on the presence of scattered clusters of pleomorphic calcifications and was one of those confirmed by histology.

In this study, abnormalities were detected in 67.7% of the population, which buttresses the high sensitivity of mammography in detection of breast diseases. In this group of patients with abnormal findings on mammograms, the commonest finding was circumscribed opacity with smooth margins constituting 66.5%. The differential diagnoses of such findings in this study were fibroadenoma, papilloma, cyst, phylloides tumor intramammary node and axillary lymph node as documented in many radiological

| Table 4: Distribution of mammographic findings |
|---------------------------------------------|
| Mammmographic Findings | Number of patients (Frequency) | Percentage |
| Normal findings | 266 | 32.3 |
| Circumscribed opacity with regular margin | 371 | 46.5 |
| Opacity with irregular, angular or spiculated margin | 93 | 11.7 |
| Calcification | 147 | 17.8 |
| Focal area of glandular asymmetry | 28 | 5.0 |
| Tubular retroareolar soft tissue opacity | 18 | 3.2 |
| Diffuse increased opacity in male | 2 | 0.4 |

| Table 5: BIRADS assessment categories distribution |
|---------------------------------------------------|
| BIRADS assessment | Number of patients (Frequency) | Percentage |
| Inconclusive study | 54 | 6.6 |
| Normal findings | 248 | 30.1 |
| Benign findings | 245 | 29.7 |
| Probably benign findings | 183 | 22.2 |
| Suspicious findings | 49 | 5.9 |
| Highly suspicious findings | 41 | 5.0 |
| Known cancer | 4 | 0.5 |
texts. The mammographic features of these lesions and use of adjuvant imaging modality like breast ultrasound coupled with relevant clinical history was used in narrowing the differential diagnosis or clinch a diagnosis. For example, breast cysts were confirmed on ultrasound.

Topmost on the differential diagnosis of circumscribed opacity in this study was fibroadenoma. Generally benign breast diseases are commoner than their malignant counterpart and fibroadenoma has been shown to be the commonest histological-proven benign breast disease while fibrocystic disease was the commonest in the study by Ochicha et al.

Breast cancer is a common malignant disease estimated to affect approximately 12.15% of women born today over the course of their lifetime. A total of 16.7% opacity with irregular, speculated or angular margin was observed in this study. In addition patients had complimentary breast ultrasound and were categorized as suspicious or highly suspicious lesions. Also, 5% of the abnormalities showed as area of focal asymmetry, this could be benign as in cases of summated fibrous tissue, radial scar or perhaps malignant lesions. Tubular retroareola soft tissue opacity was seen in 3.2% of cases, this is higher than seen in Study of Akinola et al., but slightly lower than that of Pak-art et al. Sonography showed these to be dilated ducts with or without intraductal masses. The common differentials for this was papillomatosis, malignant papilloma, ductal ectasia or ductal extension of a centrally located carcinoma. The suspicious and highly suspicious lesions are higher than in previous studies and this further emphases the need and value of cytology and histology as the final arbiter in confirming malignant lesions. We could only lay our hands on twenty-nine histology confirmed results during the course of this study. However, a multidisciplinary study to correlate our findings with clinico-pathological findings is being designed. Combination of mammography, breast ultrasound and palpation yields higher sensitivity as to when use alone and this would reduce unnecessary biopsies and its associated risks.

Calcifications are of various types, shapes and density. They can be associated with benign or malignant diseases of the breast. It was seen in a total 17.8% of the mammograms with or without an associated opacity. This value varies for different studies but predominance of the vascular type tallies and a strong correlation of breast arterial calcification with age have been established in a study by Loberant N et al. The worrisome looking types such as pleomorphic and casting type constituted about 19.7% of the calcifications and this could be the earliest sign of breast cancer. This was a major finding in a case of histological confirmed breast cancer documented during a screening program in this centre previously. Two of the male patients had diffuse increased opacity of their breast tissue with no focal mass while the remaining six had focal masses. Fifty four of the patients that were asked to come for breast ultrasound scan based on their mammograms (BIRADS 0) defaulted, thus their studies were in conclusive. This could be due to logistics factors or resort to alternative treatment. The high proportions of the BIRADS 2 (benign) and BIRADS 3 (probably benign lesions) follow the trend of higher incidence of benign breast lesions generally. The BIRADS 4 and 5 lesions seen were slightly higher than previously documented locally but could be explained by the higher number of patients in this study. Four of the five cases of known cancer (BIRADS 6) were confirmed on imaging while one of them due to the ulcerating cancer had imaging of the contralateral breast and was classified accordingly.

**CONCLUSION**

The level of awareness of breast cancer is quite high as justified by almost half of the study population that came for screening mammography. The highest indication for diagnostic mammography was breast lump. The scattered fibroglandular breast pattern was most predominant. Majority of mammographic findings had benign features. Some of the suspicious-looking lesions were confirmed by histology. The high mammographic yield emphasizes the value of a multidisciplinary approach in the management of breast diseases.

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