An Audit of Diagnostic Mammography Examination among Women Presenting with Breast Symptoms

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ABSTRACT

Background: Mammography is one of the imaging modalities that has been in existence for a long period of time in investigating the breast for pathologies. Its use in imaging the breast can be for the purpose of screening and diagnosis. Breast screening allows for early detection of breast cancer. Early detection of breast can save lives. Despite its important imaging modality for breast, mammography is not readily available in this part of the world. Our institution just acquired one recently.

Objectives: Therefore, the aim of our study is to document the pattern of mammographic findings and to determine the prevalence of breast pathologies (benign and malignant) among symptomatic patients referred for mammography.

Methodology: This descriptive cross-sectional study comprises 121 symptomatic women who presented for mammographic examination at the Radiology Department of the University of Abuja Teaching Hospital, Gwagwalada from January 2016 to December 2018. Two basic views (cranio-caudal and mediolateral views) of the breast were obtained using an EXR-650 mammographic machine. Some of the patients had complimentary ultrasound scans.

Results: The mean age of the study population was 47.23 ± 8.25 with an age range of 32–77 years. The majority of the patients were in the age group 40–49 years. Most women in the study were premenopausal and the majority had no family history of breast cancer. Breast pain was the most common symptom patients presented with. Heterogenous fibro glandular tissue accounted for the majority of mammographic breast density. Age correlated positively with a pattern of breast density among the study population. Abnormal mammographic findings were seen in 67 (55.4%) patients among which benign mass was the most prevalent. Among patients who presented with breast pain majority had normal mammographic findings while for those with breast lump, benign breast mass accounted for 35.7% representing the majority and malignant mass accounted for 19.1%. The relationship between mammographic outcome and indication was statistically significant \( P = 0.0001 \).

Conclusion: Mammography plays a pivotal role in the evaluation of the breast in patients who presented with symptoms as it can differentiate benign and malignant lesions of the breast. In this study, the use of mammography reveals various pathologies in which benign breast mass accounted for the majority of breast pathologies detected.

Keywords: Mammography, Outcome, Symptoms, Women.
1. INTRODUCTION

Breast diseases are frequently encountered in clinical practice and lesions in the breast have been broadly classified as benign and malignant lesions. Benign lesions of the breast constitute a heterogeneous group of diseases to include developmental anomalies, inflammatory conditions, epithelial and stroma proliferation, and neoplasm [1]. The majority of the breast disease is benign and most especially affects the young and premenopausal women [1]–[3]. Breast cancer is the most common malignancy globally, the most dreaded of all breast disease and it is of great concern because it is associated with high mortality and morbidity, especially in poor resource countries. Death from breast cancer accounts for 16% of all cancer-related deaths in Nigeria [4]. However, the high mortality and morbidity associated with breast cancer can be reduced by 30% with screening mammography [5].

Mammography is one of the primary imaging modalities not only for cancer screening in asymptomatic women but also for evaluation and diagnosis of breast disease in patients with breast symptoms and signs. Therefore, mammography can perform two services: screening and diagnosis. Diagnostic mammography is an important tool that is performed in women who have symptoms and signs of breast disease like lumps, pain, and nipple discharge [1], [4]. In the evaluation and diagnosis of breast disease, it is important to differentiate benign from malignant breast lesions due to the different interventions instituted. Differentiating these lesions on mammography is based on using the grading system developed by the American College of Radiologists known as Breast Imaging Reporting and Data System (BIRADS). The BIRADS contains standard descriptors for benign and malignant breast lesions and is generally categorized into numbers 0–6 with numbers 2–3 representing benignity and 4–6 malignant [1], [6]. However, the flaws of mammography for the diagnosis of breast lesion depends on the density of the breast parenchyma, as dense breast obscure lesions thereby reducing the sensitivity of mammography [7]–[9]. Despite the advantages of mammography as a screening tool for early detection of breast cancer and for diagnosis in symptomatic women, its availability and affordability in low resource-poor countries to which Nigeria belongs is a major concern and poses a great challenge. Where mammography is available most patients will have to pay out of pocket in the country. Some women with breast symptoms may seek cheaper local alternative therapy rather than presenting to the hospital for early intervention. A study in Nigeria also reported a low referral of women for mammography by physicians [10]. So, it is not surprising as evidence shows there is a rise in the number of breast cancer cases in Nigeria with an incidence of 36.3 to 50.2/100,000 live births [4].

Ultrasound and magnetic resonance imaging (MRI) are complementary imaging modalities to mammography in diagnosing, characterization, and evaluating breast disease in symptomatic women, especially with very dense breasts. Ultrasound is used routinely for these roles; however, the use of MRI still plays a limited role in our environment due to lack of availability, cost, and scarcity of skilled personnel in interpreting breast MRI images. Other non-imaging evaluations of patients with breast disease include a thorough clinical breast examination and when necessary, a breast cytology and biopsy for histological diagnosis [9], [11].

Following the acquisition of a mammographic in our center, it is necessary to audit our services and determine the spectrum of breast diseases presenting in our facility thereby adding to the database of breast disease in Nigeria and beyond for informed policy decisions, which will further be increasing the awareness of breast cancer and the importance of diagnostic mammography to evaluate breast lesions. Therefore, the main aim of this study is to document the mammographic findings and prevalence of breast disease among symptomatic patients referred for diagnostic mammography.

2. MATERIALS AND METHOD

Study Design: This was a descriptive cross-sectional study that spanned thirty-three months from March 2015 to December 2018.

Study Area: This study was carried out at the Radiology Department of the University of Abuja Teaching Hospital, Gwagwalada, (F.C.T). The Hospital is located in Gwagwalada whose geographical coordinates are 8°56’29” North and 7°5’31” East. The hospital receives patients from the neighboring states of Nasarawa, Kogi, Niger, and Kaduna.

Study Population: These comprise consecutive one hundred and twenty-one women with breast symptoms and signs referred to the radiology department for mammography.

All patients had a standard craniocaudal and mediolateral oblique view of both breasts using an EXR-650 machine, Model MC ARM (1), MP = CP (1) manufactured by Ecoray Company Limited, Seoul, Korea © 2014. Additional views were obtained when necessary. Images of the breast were reviewed by consultant radiologists (authors) and mammographic breast density patterns and overall findings were reported using the American College of Radiologists Breast Imaging, Reporting and Data System descriptor (ACR-BIRADS). Mammographic breast density patterns were classified into four groups according to the BIRADS lexicon: BIRADS 1: entirely fatty (glandular tissue <25%), BIRADS 2: scattered fibro glandular tissue 25%–50% fibro glandular tissue), BIRADS 3: heterogenous dense (51%–75% fibro glandular tissue), BIRADS 4: extremely dense (75% fibro glandular tissue).

The mammographic outcomes were given final assessment using the BIRADS lexicon: BIRADS 0: Inconclusive, BIRADS 1: Normal, BIRADS 2: Benign, BIRADS 3: Probably benign BIRADS 4: Suspicious, BIRADS 5: Highly suspicious, BIRADS 5: Known proven biopsy-.
period, family history of breast cancer, history of breast-feeding, use of contraceptives, and any past history of breast surgery which were all entered into the Excel sheet.

Data Analysis: Data were collated and analysed using SPSS 19.0 software 2010 by IBM® USA. P-value $< 0.05$ was taken as statistically significant. The results are presented in the form of tables and charts. Pearson correlation test was done to determine the relationship between variables.

3. Results

During the study period, there were 121 women with symptomatic breast disease who presented for mammographic examination. The mean age of the study population was $47.23 \pm 8.25$ with the age range of 32–77 years. The majority of the women were in the age group 40–49 years representing 42.9%, followed by the age group 50–59 representing 37.2%. Age 70–79 had only one patient representing 0.82% (Fig. 1).

The majority of the respondents were of Hausa extraction and civil servants accounting for 60 (49.59%) and 50 (41.32%). Based on parity, 61 (50.41%) of the women had between two to four children (multiparous) and nulliparous women accounted for 18 (14.88%). Among the correspondents, 76 (62.81%) were not on contraceptives which accounted for the majority. Among those that used contraceptives, the injectables were more common representing 24 (19.8%). There were 69 (57%) premenopausal women and 52 (42.9%) were postmenopausal. The majority 101 (83.4%) did not have a family history of breast cancer. Most women 88 (72.73%) breastfed their children for one year (Table I).

Breast pain was the most common symptom women presented with representing 60 (49.59%) followed by lump and nipple discharge accounting 42 (34.71%) and 14 (11.57%) respectively. There were 5 (4.13%) women who presented with more than one symptom (Fig. 2).

The pattern of mammographic breast density in the study population was heterogenous fibroglandular tissue representing the majority 50 (41.32%), entirely fatty 31 (25.62%), extremely dense breast 21 (17.36%), and least scattered fibroglandular tissue 19 (15.70%). The extremely dense pattern of breast density was more common 9 (42.9%) among the age group 30–39 years. Heterogenous and scattered fibroglandular breast density were the most prevalent among the age group 40–49 accounting for 31 (62%) and 8 (47.4%) respectively. Entirely fatty breast density was the most observed pattern among women in age groups 50–59 and 60–69 representing 18 (58.1%) and 5 (16.1%) respectively. Age correlated positively with pattern of breast density among the study population, and this was statistically significant $P = 0.0001$ (Table II).

The pattern of mammographic examination in women with symptomatic breast disease was normal in 54 (44.6%) and abnormal in 67 (55.4%). The differences observed between the normal and abnormal mammographic outcome was statistically significant $P = 0.03$. The abnormal findings noted in mammograms of women who presented with breast symptoms include benign mass (Fig. 3)2 2 (18.18%), malignant mass 9 (7.44%), benign calcification 13 (10.74%), malignant calcification 3 (2.48%) inconclusive 18 (14.88%), focal asymmetry 1 (0.83%), and architectural distortion 1 (0.83%) (Table III).

Using the BIRADS as final assessment of mammographic outcome 18 (14.88%) were categorized as BIRADS 0 (inconclusive), 56 (46.28%) were BIRADS 1 (normal), 27
TABLE II: AGE DISTRIBUTION AND BREAST DENSITY

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency (%)</th>
<th>Entirely fatty (%)</th>
<th>Scattered fibroglandular tissue (%)</th>
<th>Heterogeneous dense breast (%)</th>
<th>Extremely dense breast (%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>30–39</td>
<td>17 (14.1)</td>
<td>2 (6.5)</td>
<td>2 (10.5)</td>
<td>4 (8.0)</td>
<td>9 (42.9)</td>
<td>0.0001</td>
</tr>
<tr>
<td>40–49</td>
<td>52 (42.9)</td>
<td>5 (16.1)</td>
<td>9 (47.4)</td>
<td>31 (62.0)</td>
<td>7 (33.3)</td>
<td></td>
</tr>
<tr>
<td>50–59</td>
<td>45 (37.2)</td>
<td>18 (58.1)</td>
<td>8 (42.1)</td>
<td>14 (28.0)</td>
<td>5 (23.8)</td>
<td></td>
</tr>
<tr>
<td>60–69</td>
<td>6 (4.9)</td>
<td>5 (16.1)</td>
<td>0 (0.0)</td>
<td>1 (2.0)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>70–79</td>
<td>1 (0.8)</td>
<td>1 (3.2)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td></td>
<td></td>
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<tr>
<td>Total</td>
<td>121 (100.0)</td>
<td>31 (100.0)</td>
<td>19 (100.0)</td>
<td>50 (100.0)</td>
<td>21 (100.0)</td>
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Comparing the indication with the mammographic outcome, the majority of women 36 (60%) who presented with breast pain had normal outcomes, among women with breast discharge 8 (57.1%) had normal outcomes and 6 (42.9%) were inconclusive. Out of the 42 women who presented with breast lumps 15 (35.7%) were benign mass, 8 (19.1%) were malignant mass, 8 (19.1%) were inconclusive, 1 (2.4%) accounted for benign calcification, 2 (4.8%) were malignant calcification, 1 (2.4%) accounted for architectural distortion and 7 (16.7%) were normal (Table IV). The relationship between mammographic outcome and indication was statistically significant $P = 0.0001$. Mammographic outcome correlated positively with indications. The chi-square is 82.34.

From the 31 women with entirely fatty breast density, breast mammographic outcome was normal for 17 (54.8%) which represents the majority and 4 (12.9%) had benign mass. Mammographic outcome for women with scattered fibroglandular tissue were 9 (47.4%), 5 (26.3%), 3 (15.8%) for normal, benign mass and malignant mass respectively. For the 50 women with heterogenous fibroglandular breast density, 21 (42%) had normal mammographic outcome, 10 (20%) benign mass, 9 (18%) benign calcification, 8 (16%) inconclusive, 1 (2%) malignant mass and 1 (2%) malignant calcification. In women with extremely dense breast density 8 (38.1%) out of 21 had inconclusive outcomes on mammogram, 7 (33.3%) were normal, and 3 (14.3%) benign mass. The relationship between mammographic outcome and breast density was not statistically significant $P = 0.32$ (Table V).

Out of the 17 women in the 30–39 age group 8 (47.1%) had normal mammographic findings, 5 (29.4%) were inconclusive, 2 (11.8%) were benign mass and 2 (11.8%) were malignant mass. Of the 52 women in the 40–49 age group, the outcome of mammographic examination was normal in 23 (44.2%) which accounted for the majority, 11 (21.2%) had benign mass, 10 (19.2%) were inconclusive and 4 (7.7%) had malignant mass. The outcome of mammographic examination in 45 women in the 50–59 age group was normal in 20 (44.4%), 8 (17.8%) had benign mass, 8 (17.8%) benign calcification 3 (6.7%) was inconclusive and 2 (4.4%) malignant mass. There was a positive association between the age of the symptomatic women investigated and the mammographic outcome $\chi^2 = 55.01$, $P = 0.005$ (Table VI).

The relationship between risk factors and the mammographic outcome was also studied, however, the relationship was statistically significant with a family history of breast cancer $P = 0.0001$. For other risk factors...
the relation with mammographic outcome was not statistically significant; (Occupation; P = 0.466, Parity; P = 0.704, Tribe; = 0.780, Breastfeeding; P = 0.116 and family planning; P = 0.279) (Table VII).

4. Discussion

Mammography plays a pivotal role in the management of breast disease and screening for breast cancer. Our
The study was to determine the outcome of mammography examination in women who had breast symptoms. The mean age of the study population was 47.23 ± 8.25 with the age range of 32–77 years. The majority of the women who had breast symptoms were largely in the age group 40–49 years. This finding is in keeping with previous studies [11], but contrary to findings reported by Ebubedike et al. [4] where breast pain may be associated with some degree of inflammation but rarely occurs with breast cancer [15]. However, breast pain may be associated with some degree of inflammation but rarely occurs with breast cancer [15].

Mammographic breast density has been described as the relative proportion of radiolucent fat to the radiodense glandular epithelium and connective tissue. Breast density can predict those that will develop breast cancer and it is a known independent risk factor for breast cancer [8]. In our study, heterogenous dense fibroglandular density was the prevalent mammographic breast density pattern among the study population. This corroborates with the previous study by Ebubedike et al. [11] but at variance with Akande et al. [8]. Among the categories of breast density pattern, extremely dense and heterogenous breast densities are high-risk densities as cancers can easily be obscured in them thereby lowering the sensitivity of cancer detection.
on mammography. From our study 8 (16%) of patients with heterogenous breast density and 8 (38%) with extremely dense breasts had inconclusive results and needed additional imaging. After further imaging with ultrasound and mammography two of the three patients with extremely dense had their final BIRADS assessment to 5 (highly suspicious) and had a biopsy. Two patients had their biopsy result positive for malignancy and the other had fibrocystic breast disease.

From our study, 55.4% of women who had symptoms had abnormal mammographic outcomes. Our finding was lower compared to the 67.7% obtained by Akande et al. [8]. However, the high percentage of abnormalities detected in both studies further buttresses the high sensitivity of mammography in detecting breast disease. Out of the abnormal findings detected from the mammogram, benign breast mass constituted 18.8% making it the most common abnormalities in this study. Most studies have shown that benign breast diseases are more common compared to other disease of the breast [1]–[3], [8]. The benign breast mass appeared as a well-circumscribed mass with a smooth margin, and low-medium density appearance with further evaluation with ultrasound some of the benign masses are seen as cystic lesions. Fibroadenoma and breast cyst make the top list of differential diagnoses for benign breast mass.

5. Conclusion

Various pathologies were seen among patients with symptomatic breast disease in this study among which benign breast mass was the most common. This further buttresses the pivotal role of mammography plays in the evaluation of breast pathologies.

Conflict of Interest

Authors declare that they do not have any conflict of interest.

REFERENCES