INTRODUCTION

Mammography is a radiographic imaging technique for screening and diagnosis of breast pathologies using low energy ionizing radiation in the range of 20–35 KV. It has an advantage over ultrasonography and magnetic resonance imaging techniques due to its reported high sensitivity and specificity, nonoperator dependence, relative availability, and affordability.\[^{1,2}\]

Mammographic findings of breast disease may be clinically asymptomatic or symptomatic. These may present as architectural distortions as in carcinoma and radial scar, circumscribed masses such as lipoma, lymph node, fibroadenoma, and calcifications (micro- and macro-calcifications).\[^{2-4}\]

ABSTRACT

Background: Screening mammography is a radiographic examination of the breast performed for early detection of breast cancer in asymptomatic women. The American College of Radiology recommends that women should have mammography at the age of 40 years and annually thereafter. However, those who are at increased risk of breast cancer should start screening mammography earlier. These include patients with a strong family history of breast cancer or those who had radiotherapy to the chest wall.

Objective: This study is aimed at evaluating the mammographic outcomes among 77 Nigerian females who had screening mammographic breast examination.

Materials and Methods: From December 2010 and November 2012, 77 females had routine screening mammography in the department with the general electric alpha-RT machine with model number MGF-101 (manufactured 2010). All the participants had to fill a mammographic form consisting of variables such as age, sex, occupation, family history of breast cancer, tribe, contraception, parity and caffeine consumption, history of surgical intervention (lumpectomy, biopsy, and/or mastectomy), previous mammography, and last childbirth. Mediolateral-oblique and cranial-caudal views were done for the breast examination though additional were occasionally employed.

Results: Seventy-seven females had screening mammography. The minimum age recruited was 40 years. The mammographic outcome for those who had screening was normal in 51 (66.2%) and abnormal in 26 (33.8%) participants. The abnormal mammographic outcomes were architectural distortion in either or both breasts in 13 (16.9%) participants, masses in either or both breast in 11 (14.3%) participants, while isolated calcification in either or both breast among 2 (2.6%) participants. Two (18.2%) of the subjects with masses had associated macrocalcification. No masses with malignant features were seen.

Conclusion: Screening mammography was found out to be useful in detecting various forms of breast pathologies which were mostly breast masses, calcifications, and architectural distortions. Screening mammography is, therefore, advised yearly and routinely for women age 40 years and above.

Keywords: Breast cancer screening, mammography, patterns

IN ORIGINAL ARTICLE

Mammographic screening patterns in Sokoto, Northwestern Nigeria

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INTRODUCTION

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Mammography is the single most important imaging method in diagnosing breast disease. Its areas of application include screening and diagnosis. Screening mammography is a radiographic examination of the breast performed for early detection of breast cancer in asymptomatic women. The American College of Radiology (ACR) recommends that women should have mammography at the age of 40 years and annually thereafter. However, those who are at increased risk of breast cancer should have the mammography earlier. These include patients with a strong family history of breast cancer or those that had radiotherapy to the chest wall.

Mammography has a sensitivity of about 90%. This implies that 10% of carcinomas which are otherwise symptomatic at the time of mammographic examinations are not detected by mammography. Overall sensitivity of mammography in fatty tissue is excellent. It decreases as radiodensity increases.

Breast cancer is a major cause of suffering and death and is of significant concern to many women. The incidence has been steadily rising since the 1980s, which has been partly attributed to increased awareness and availability of mammographic facility, the screening tool.

The Breast Imaging Reporting and Data System (BIRADS) Lexicon was introduced by the ACR to provide a clear and concise way to report the mammographic results. A BIRADS category is reported at the end of every mammogram report.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Birads category</th>
<th>Frequency n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast density</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatty</td>
<td>1</td>
<td>32 (41.6)</td>
</tr>
<tr>
<td>Mixed Fatty</td>
<td>2</td>
<td>32 (41.6)</td>
</tr>
<tr>
<td>Mixed Glandular</td>
<td>3</td>
<td>6 (7.8)</td>
</tr>
<tr>
<td>Glandular</td>
<td>4</td>
<td>7 (9.1)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>77 (100)</td>
</tr>
</tbody>
</table>

The fatty and mixed fatty breast density categories were the most frequent following screening mammography.

Screening in African women including Nigerians is underutilized probably due to poor practices from poor knowledge.

The overall diagnostic accuracy of digital and film-screen mammography in screening for breast cancer is similar. However, digital mammography is more accurate than film-screen mammography in women under the age of 50 years, women with radiographically dense breast, and premenopausal or perimenopausal women. This study is aimed at evaluating the mammographic outcomes among 77 Nigerian females who had screening mammographic breast examination (film-screen mammography).

**MATERIALS AND METHODS**

Between December 2010 and November 2012, 77 females had routine screening mammography in the department with the general electric alpha-RT machine with model number MGF-101 (manufactured 2010). All the participants had to fill a mammographic form consisting of variables such as age, sex, occupation, family history of breast cancer, tribe, contraception, parity and caffeine consumption, history of surgical intervention (lumpectomy, biopsy, and/or mastectomy), previous mammography, and last childbirth. Mediolateral-oblique and cranial-caudal views were done for the breast examination though additional views were occasionally employed. The images were acquired on the special single-emulsion mammographic film. These and the obtained biodata were stored in the departmental archive. For this study, the mammograms of all the participants and their filled biodata were retrieved from the departmental archive. The required variables were recorded, and the retrieved mammograms reported and subsequently analyzed using statistical software (SPSS version 17).

Mammograms from adult females that had screening mammographic examination were included in the study while mammograms from females <40 years of age were excluded from the study.
Ethical approval for the study was obtained on 2\textsuperscript{nd} August 2012 from the Research and Ethical committee of Usman Danfodiyo University Teaching Hospital Sokoto. After ethical approval insert (UDUTH/HREC/56) dated 8\textsuperscript{th} August 2012. All the procedures have been carried out according to the guidelines given in Declaration of Helsinki 2013.

Analysis began with descriptive statistics (mean and standard deviation) for quantitative data and was followed by inferential statistics (Chi-square test) to determine any relationship. The results were presented in the form of tables. All statistical tests were carried out using Chi-square tests, with level of significance set at 0.05.

**RESULTS**

Seventy-seven females had screening mammography out of the two hundred females that had mammography. The minimum age recruited was 40 years. All the participants who had screening mammography had no complaints.

The mammographic outcome for those who had screening was normal in 51 (66.2\%) and abnormal in 26 (33.8\%) participants. The abnormal mammographic outcomes were architectural distortion in one or both breasts in 13 (16.9\%) participants, masses in one or both breast in 11 (14.3\%) partipants, while isolated macrocalcification in one or both breast among 2 (2.6\%) participants as shown in Figure 1. Two (18.2\%) of the participants with masses had associated macrocalcification. No masses with malignant features were seen. Fifty-one (66.2\%) of those who had screening mammography had BIRADS-1 category of mammographic outcome, 24 (31.2\%) had BIRADS-0 category, while 2 (2.6\%) had BIRADS-2 category.

Breast densities were categorized as either entirely fatty, mixed fatty, mixed glandular, and glandular; the BIRADS-1 category (entirely fatty; glandular tissues <25\%) was seen in 32 participants (41.6\%), BIRADS-2 category (scattered; fibroglandular tissues ranging from 25 to 50\%) in 32 participants (41.6\%), BIRADS-3 category (heterogenously dense; fibroglandular tissues ranging from 51\% to 75\%) in 6 participants (7.8\%) while BIRADS-4 category (glandular; fibroglandular tissues above 75\%) in 7 (9.1\%) participants, respectively [Table 1].

The abnormal mammographic findings found in 26 (33.8\%) participants who had screening mammography were observed to have was not related to with tribe ($P = 0.77$), family history ($P = 0.50$), caffeine consumption ($P = 0.29$), breast density ($P = 0.32$), age ($P = 0.97$), occupation ($P = 0.45$), contraception ($P = 0.32$ Table 2), and parity ($P = 0.61$ Table 2).

In this study, it was found that age had a statistically significant association with breast density with $P = 0.03$ [Table 1].

**DISCUSSION**

A lot of information can be extracted on mammograms, and breast diseases may present symptomatically or as asymptomatic mammographic findings.\cite{2} High-quality mammography screening is a major health achievement as it reveals various types of breast lesions including cancers.\cite{11} In this study, the highest frequency of screening mammographic examination was found in the 40–44 years' age group. This is similar to the study of Elsie \textit{et al}.\cite{12} in Uganda and Ohlinger \textit{et al}.\cite{13} in Germany.

In this study, most of the study populations were married women which is similar to the studies of Mark \textit{et al}.\cite{14} in Southeastern Nigeria and Obajimi \textit{et al}.\cite{15} in Southwestern Nigeria where most of the study population were married women. This finding differed considerably from the study of Elsie \textit{et al}.\cite{13} in Uganda who had only 10\% of their study population to be married women. This variance is probably due to differences in cultural practices.

Most of the participants in this study population were Hausas, while in the study of Obajimi \textit{et al}.\cite{15} in Ibadan,
the Yoruba tribe predominated. This is because the study area is predominantly inhabited by them. The majority of the recruited participants in this study are unemployed; this is similar to that reported by Elsie et al.\[12\] in Uganda and at variance to that reported by Akinola et al.\[16\] in Lagos in Southwestern Nigeria where skilled workers had the highest frequency.

The educational status for most screeners was quite low; this must have accounted for their low level of awareness of mammographic practices. This finding was also noted by Akinola et al.\[11\] and Obajimi et al.\[15\] in their studies.

Most of the participants had no history of mammographic breast examination done, and they also had a little knowledge of mammographic practice. These were similar to that reported by Akinola et al.\[11\] Akinola et al.\[16\] in Lagos, Nigeria, Obajimi et al.\[15\] in Ibadan, Nigeria, Osime et al.\[17\] in Benin, Nigeria, and Elsie et al.\[12\] in Uganda most likely due to the same cultural practices and inadequate mammographic facilities. This is at variance to that reported by Oche et al.\[18\] in Sokoto, Northwestern Nigeria where the recruited participants had adequate knowledge of mammographic practices probably because they were all health workers.

The source of information about mammography and mammographic screening among the recruited participants in this study was in the hospital; this is at variance from that reported by Akinola et al.\[16\] in Lagos were television adverts and information from friends accounted for the highest sources of information and Obajimi et al.\[15\] in Ibadan were newspapers and magazines appeared to be the most important sources of information.

Family history of breast cancer was also low, and this finding was similar to those found by researchers in Nigeria and Uganda.\[12,15-18\] This is presumably from lack of awareness on the part of the participants. This finding is at variance to the high value reported by Warner et al.\[19\] in Toronto where an established mammographic practice exists and Osime et al.\[17\] in Benin, Nigeria, where the recruited participants were all civil servants.

All the participants who had screening mammography were referred by their physicians; this is at variance to that reported by Temitope et al.\[20\] in Ibadan, Nigeria, where majority of the physicians fail to send asymptomatic women for screening mammography either because of nonavailability or cost of the procedure.

The prevalence rate of screening mammography was found to be 38.5% in Sokoto within the study period; this is similar to that reported by Akinola et al.\[16\] in Lagos, Nigeria. This is lower when compared to that reported by Awosanya et al.\[2\] and Akinola et al.\[21\] both in Lagos, Nigeria. This is probably due to availability of the facility before Sokoto and increased awareness of the benefits of breast screening in Lagos. The mammographic outcome from screening mammography was mostly normal and also similar to that reported by Awosanya et al.\[2\] in Lagos, Nigeria, most likely because of the same social, geographical location and cultural practices. Mammographic breast density following screening was found to have a significant association with age; this is similar to the study of Obajimi et al.\[15\] in Ibadan, Nigeria.

Abnormal screening mammographic findings were observed in this study to have a statistically nonsignificant association with tribe, occupation, parity, consumption of caffeine, family history of breast cancer, hormonal contraception, and breast density of the recruited participants.

The preponderant BIRADS classification of screening mammographic findings in this study is BIRADS-1 and is in agreement with the study of Awosanya et al.\[2\] This varies from what Akinola et al.\[11\] reported from Lagos with their most frequent BIRADS classification of mammographic findings being BIRADS-2.

Some of the limitations of this study include; some statistics/information was not available in some cases. Patient recall for important data was impossible and...
only the available cases within the stated period were used for the study. A detailed pro forma was not used reason being that this is a retrospective study.

**CONCLUSION**

Screening mammography was found out to be useful in detecting various forms of breast pathologies which were mostly breast masses, calcifications, and architectural distortions. Screening mammography is, therefore, advised for women age 40 years and above.

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Nil.

**Conflicts of interest**

There are no conflicts of interest.

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