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Screening mammography features in Nigerian women: A pilot study

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Abstract

Background: Screening mammography is underutilised in our environment, and this is a major factor in late presentation of breast cancer. Our objective was to evaluate the importance of screening mammography in a population of Nigerian women and to describe the pattern of early breast cancer.

Methods: A prospective study of 305 women that presented for screening mammography following a health campaign on breast cancer awareness.

Results: Negative Mammogram (BI-RADS 1) comprised 77.37%. Benign mammogram (BI-RADS 2) was 13.77%. BI-RADS 3 and 4 comprised 1.30%; inconclusive mammogram (BI-RADS 0) was 7.54%. Breast mass is the most common lesion, bilateral in 6 and unilateral in 19 or in combination with other pathologies in 5 women. Calcifications alone were present in 10 women; while asymmetric densities without other pathologies were noted in 7 women.

Conclusion: The mammographic appearance of early breast cancer in Nigeria women is similar to findings in developed nations. The provision of screening facility will definitely reduce the scourge of late presentation and resultant deaths from breast cancer in our environment.

Keywords: Breast Neoplasm, mammograms, mass screening, BI-RADS.

Résumé

Le dépistage mammographique est moins utilisé dans notre environnement, et ceci est un facteur majeur pendant la présentation tardive du cancer du sein. Notre objectif était d'évaluer l'importance du dépistage mammographique chez une population des femmes nigériane et de décrire la fréquence du cancer du sein précoce. Cette étude prospective sur 305 femmes qui venaient pour le dépistage mammographique suivi d'une campagne de sensibilisation

sur le cancer du sein. Les Mammogrammes négatives (BI-RADS 1) comprenaient 77.37%. les cas bénignes (BI-RADS 2) étaient de 13.77%. BI-RADS 3 et 4 comprenaient 1.30%; Mammogrammes inclusives (BI-RADS 0) chez 7.54%. La masse au sein était la plus commune avec une lésion bilatérale chez 6 et unilatérale chez 19 ou en combinaison avec autres pathologies chez 5 femmes. Seules Les calcifications étaient retrouvées chez 10 femmes; tandis que les densités asymétriques sans pathologies étaient notées chez 7 femmes. En conclusion, l'apparence de la mammographique dans le cancer du sein précoce chez les femmes au Nigeria est semblable aux données dans les pays développés. La provision des facilités de dépistage réduira définitivement le taux de présentation tardive et de décès du cancer du sein dans notre environnement.

Introduction

The introduction of Mammographic technique for screening breast cancer has been slow and virtually nonexistent in many parts of sub-Saharan Africa, and Nigeria is not an exception. In some of the few countries in Africa with mammographic facilities, the effort has been largely uncoordinated [1]. Early detection and treatment are the means to reduce the mortality and morbidity of breast cancer. In Sweden, multiple studies have shown that the death rate decreased when screening was introduced, while the death rate remained unchanged for women who refused to participate in the screening programme [2,3]. In the United States, mortality from breast cancer began to drop in the 1990s when more women participated in screening programs [4]. A major drawback of screening is the increased biopsy rates and psychological effects of false reassurance or false-positive results; but current studies have demonstrated that screening mammography has net benefits [3]. In the developed countries there are strict guidelines and multiple regulatory bodies supervising the practise of breast imaging.

Nigeria does not have a national breast cancer screening program or policy on breast cancer screening. Most researches on knowledge, attitude

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and practise of Nigerian women to breast health usually conclude that they have poor practises to breast health and most do not go for breast imaging [1,5,6]. Clinical studies are usually focused on diagnostic mammography or a combination of both diagnostic and screening mammography; we conducted this pilot study to assess the importance of screening mammography in a population of Nigerian women.

Materials and methods

This was a prospective descriptive study carried out in the radiology department of our institution over a period of 10 months from October 2009 to August 2010. Our objective was to conduct screening mammography on women from the age of thirty five years and above. To encourage women to participate in the study, we developed a local awareness campaign program on the importance of screening mammograms which was broadcasted on the radio and local television station; English and the local language 'Yoruba' were used as the medium of communication. We also had intensive campaigns in the churches, and mosques to reach as many women as possible. In order to achieve mass participation, the cost of screening mammography including that of breast ultrasonography if necessary were reduced to two thousand Naira only (13 dollars) from the initial cost of 10,000 naira (66 dollars). At the conclusion of the campaigns, the women were encouraged to book for screening mammogram.

The subjects were selected based on the following criteria; they must be women of 35 years and above, willing to undergo incision or excision biopsy if indicated. The exclusion criteria are women less than 35 years, any symptom or signs of breast disease and those with current pregnancy. At the time of mammography, patients completed a questionnaire that included the demographics, mammographic history and previous breast surgery.

Mammography was done with an Allengers mammographic machine 4035, using a conventional film screen combination and standard screens (Kodak), single emulsion film and dedicated processing equipment. The mammograms were reviewed by the authors based on Breast Imaging Reporting and Data System (BI-RADS) of the American College of Radiologists, (ACR). BI-RADS is the communication tool in mammography reports in most of the countries with breast cancer screening program and it is intended to homogenize the mammographic, ultrasound and magnetic resonance imaging reports [7].

The breast has a wide range of normal appearance on mammography according to tissue composition, four categories are described and analysed in this study [8]:

- Type 1: fatty breast (less than 10% of dense tissue).
- Type 2: fibroglandular (10–49% of dense tissue).
- Type 3: heterogeneously dense (49–90% of dense tissue).
- Type 4: dense and homogeneous (>90% of dense tissue).

The BI-RADS classification used in this study is in line with the ACR recommendation as follows [9]:

- BI-RADS 0 Incomplete, need for an additional imaging evaluation
- BI-RADS 1. Normal. Normal interval follow-up
- BI-RADS 2. Typically benign. Normal interval follow-up
- BI-RADS 3. Probably benign. A short interval follow-up is recommended: 4 months follow-up for masses and 6 months follow-up for microcalcifications
- BI-RADS 4 Suspicious abnormality: a biopsy should be considered
- BI-RADS 5. Highly suggestive of malignancy. Biopsy or surgery should be performed
- BIRADS 6 Histologically proven malignancy. Imaging is performed for cancer staging or evaluation after chemotherapy

The radiologist report form included the BI-RADS assessment category and recommended follow up. Women with mammographic findings (BI-RADS 2,3,4) were subjected to biopsy or surgical excision to assess the accuracy of the BI-RADS classification. Patients classified as BI-RADS 0 were referred to other facilities for further imaging.

All analysis was with SPSS version 16 (SPSS, Illinois, Chicago, USA)

Results

Three hundred and five women were involved in the study; the mean age was 49 years \pm 7.2. Majority of the women (95.4%) have never had a previous mammogram, only 10 women have had a mammogram in the last two years. The following types of breast density were noted, Type 1 and 2 comprise (63.5%); Type 4 was noted in thirteen patients (4.3%).

The most common mammographic lesions were masses, which were bilateral in 6 women and unilateral in 19. In five women the breast masses were in combination with other pathologies. Calcifications alone were present in 10 subjects. Asymmetrical

densities without other pathologies were noted in 7 subjects. (Table 1).

Table 1: Characteristics of study subjects involved in Screening Mammography

No. of Patients	305
Age	
Mean±SD	49±7.2
Previous mammography	
Never	291 (95.4)
1-2 years	9 (2.6)
<6 months	1 (0.3)
> 2 years	4 (1.3)
Normal Breast Density Types	
Type 1	75 (24.5)
Type 2	119 (39.0)
Type 3	98 (32.1)
Type 4	13 (4.3)

Negative Mammogram (BIRADS 1) comprised 77.37%. Benign and probably benign mammograms (BIRADS 2 & 3) comprised 14.75%, and probably malignant (BIRADS 4) was 0.32%, inconclusive mammogram was observed in 23 patients (7.54%). (Table 2)

Table 2: Findings in 305 subjects for screening mammography (%)

No. of Mammograms	305	(%)
No. of cancers	3	0.98
BIRADS Classification of findings		
o BIRADS 0	23	7.54
o BIRADS 1	236	77.37
o BIRADS 2	42	13.77
o BIRADS 3	3	0.98
o BIRADS 4	1	0.32
Mammographic Lesions		
o Negative	236	77.37
o Bilateral mass	6	1.97
o Unilateral mass	19	6.23
o Calcifications	10	3.28
o Asymmetric density	7	2.30
o Axillary lymphadenopathy	2	0.66
o Mass+ Calcifications	3	0.98
o Mass+ asymmetric density	2	0.66

Three cases of cancer were detected in this study, (0.98%), 2 were ductal carcinoma in situ and the third was lobular carcinoma in situ. (Table 3)

Table 3: Comparison of the BIRADS classification and Histological diagnosis for BIRADS 2, 3,4

	Benign	Malignant	Total
BIRADS 2	42	0	42
BIRADS 3	1	2	3
BIRADS 4	0	1	1

Discussion

Mammography is underutilized in our environment due to lack of facilities and awareness. In this series majority (95.4%) came for mammography for the first time, this implies that women are more interested in breast health than previously reported [1,10,11] but the low rate of mammography in Nigeria may be due to lack of access to diagnostic units and the cost. We believe that by reducing the cost to 13 dollars (2000 Naira), the economic power to conduct the test was now within the reach of most of our women.

There is presently debate on what is the most appropriate age for women to begin screening mammography; most of the studies suggest that there is a greater net benefit if the program starts at the age of 40 years for women who are not at risk [4]. However, a lower age limit can be used for women with known risk factors for the development of breast cancer. Moreover, recent studies on health care access, income, and other social factors revealed that African-American women are more likely to die when they get breast cancer. It is an established fact that breast cancer tends to occur earlier in Africans and are more aggressive [12,13]. Based on these facts, we decided to implement our screening program from the age of 35 years.

Radiographically the breast consists mainly of two component tissues: fibroglandular tissue and fat. Fat has a lower X-ray attenuation coefficient than fibroglandular tissue and therefore, is more transparent to X-rays. Thus, regions of fat appear darker on a radiograph of the breast. Regions of brightness associated with fibroglandular tissue are referred to as 'mammographic density' [14]. It is possible to determine the relative quantity of these tissues from the pattern of brightness in a mammographic image. The assessment of mammographic density is mainly qualitative, four types are described, and the higher the score the denser the breast. A dense breast has the propensity to obscure a lesion, making interpretation difficult. The sensitivity of mammography is decreased in the dense breast and a high score tells a referring physician who is concerned about breast cancer that other tests

less affected by density, such as ultrasound or magnetic resonance imaging (MRI), may be more useful for evaluation [14]. In this study most of the breast analysed were type 1 and 2 (63.5%). Extremely dense breast was noted in only 13 cases (4.3%), these patients had complementary ultrasound evaluation.

Most of the previous studies on breast imaging in Nigeria were usually on diagnostic mammography, or a combination of diagnostic and screening mammography. In these studies, abnormal mammograms value range from 29% -83% [11,15,16]. The lower value of 22.6% in our study is most probably because it was on screening mammography alone. The high percentage of negative mammograms in this study is compatible with studies based on screening asymptomatic women for breast cancer [7].

Africans and African Americans tend to have a greater proportion of the women presenting with masses as the first sign of breast cancer [17,18]. In the present study, 9.84% of subjects presented with masses, followed by calcifications (4.26%). These features are the common mode of presentation of breast cancers regardless of race, this implies that the mammographic presentation of early breast carcinoma in African women is similar to that in Caucasians in terms of appearance [19]. Breast mass was the radiographic sign commonly associated with other lesions in this study, and this is similar to the work of Venkatensen *et al* [20]. Some studies have suggested that breast masses are more predictive of cancer in white women than in African American [7,21].

It is expected that less than 10% of screening examinations would require recall for additional imaging [7]. The percentage of mammograms classified as BI-RADS 0 in this study (7.54%) is comparable to results from similar studies on screening mammography [7,20]. These patients require additional imaging for evaluation or in some cases stereotactic biopsies. Our hospital does not have MRI or stereotactic biopsy facilities as at the time of the study, and hence the patients were referred to centres with these facilities for further assessment.

The estimated values of mammography sensitivity from previous studies range from 75% to 90% and specificity from 90% to 95% [19]. Three women with early breast cancer were detected during the screening programme (0.98%), 2 with ductal carcinoma in situ and one patient with lobular carcinoma in situ (LCIS). Lobular carcinoma in situ is a rare form of breast cancer [22], and was discovered in a 37 year old woman. We believe this finding underscores the importance of screening

mammography in Nigeria. A major limitation of the study is the small sample size with consequent reduction of the accuracy of our statistical analysis.

In conclusion, this study shows that screening mammography in Nigeria offers the potential for significant reduction of mortality from breast cancer. The benefits also include early diagnosis, less aggressive therapy and improved cosmetic results. Randomised controlled trials with larger sample size should be done to ascertain the prevalence of breast cancer in our environment and the tumour biology characteristics, this information is necessary for health planning and allocation of resources.

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