Histological analysis of breast lesions in a Nigerian population

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Abstract

Context: Breast cancer is the most common site-specific cancer among women in Nigeria and globally, and it is a leading cause of cancer related fatalities.

Objective. This study documents the prevalence, histologic subtypes, relative frequency, and histopathologic characteristics of breast lesions seen in a North Central Nigerian population

Materials and Method: This was a retrospective review of all breast lesions diagnosed at the pathology department of a tertiary health institution in North Central Nigeria in a 5-year period.

Results: In the study period, 1081 patients had breast specimens taken, representing 8.6% of all specimens (12501) processed in the department. Of the 983 patients' whose specimens were included in this study, 954 were females (97%) and 29 (3%) were males, giving a female to male ratio of 32.9:1. The lesions consisted of 31 (3.2%) non neoplastic breast lesions (NBLs), 590 (60.0%) benign neoplastic breast lesions (BNBLs) and 362 (36.8%) malignant breast lesions (MBLs), with a BNBLs to MBLs ratio of 1.6:1. The most common BNBLs breast lesions seen during the study period was fibroadenoma (318/590, 53.9%), followed by fibrocystic change (186/590, 31.5%). The cancers were mostly carcinoma (98.3%) with invasive ductal carcinoma (300/362, 82.9%) being the most common followed by invasive medullary carcinoma (38/362, 10.5%).

Conclusion: Breast lesions are common lesions among females in our setting. A significant proportion of these lesions are malignant and affects young females. The histologic spectrum, demographic and histopathology characteristics are similar to previous reports in the country.

Keywords: Breast lesions, Fibroadenoma, Invasive ductal carcinoma, Fibrocystic change, North Central Nigeria.

Introduction

The breast is well developed in the human females, and its milk is an important source of nourishment and immunity for the developing infant.[1] Different types of developmental, inflammatory and neoplastic diseases afflict the breast.[1,2] The developmental and inflammatory breast diseases are relatively infrequent and not life threatening. The tumours of the breast on the other hand are more frequently encountered with the benign tumours more common than the malignant neoplasms.[1,2] While most benign breast lesions are not associated with risk of malignant transformation, few; proliferative breast lesions and complex fibroadenoma confers a higher relative risk of malignant progression with the implication that patients' with such diagnoses require clinical and radiological surveillance.[1] Breast cancer is the most common site-specific cancer among women in

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Nigeria and globally, and it is a leading cause of cancer related fatalities.[3,4] Understandably, any breast complaint elicits reasonable anxiety among patients and families alike who fear the worst.

Increasing awareness about breast cancer, advanced childbearing age and low parity, westernization of lifestyles, improved diagnostic capacity and reporting are speculated as partly responsible for the increasing incidence of breast cancer in Nigeria.[3,4] Breast diseases present commonly as breast pain, lump, nipple discharge or lumpiness occurring singly or in different combinations.[1,2] Such presentation are carefully evaluated using the graduated triple assessment approach; Clinical, radiological and histopathology assessments.[2] Findings from these combined evaluation yield the most optimal diagnostic information about the nature of a breast disease to guide planning of management.[2]

It is imperative to have baseline epidemiological data on the histological pattern of breast lesions in any setting. Such data provides reasonable estimate of local burden of the disease and serves as basis for planning local screening, counselling and treatment strategies as there are global, national and regional variations in disease burden and patterns.[4,5] There are no histological data on breast diseases in our centre. This study documents the prevalence, histologic subtypes, relative frequency, demographic and histopathologic characteristics of breast lesions seen in a North Central Nigerian population.

Materials and methods
This was a retrospective review of all breast lesions diagnosed at the pathology department of the University of Abuja Teaching Hospital, Abuja, Nigeria from January 1, 2015, to December 31, 2019. These breast specimens included incision biopsies, core needle biopsies, excision biopsies and mastectomies. They were received in 10% neutral buffered formalin and routinely processed. Sections from paraffin embedded tissue blocks were routinely stained with haematoxylin and eosin stains. Departmental registers, Patients' request forms and duplicate copies of all the histologically diagnosed breast lesions during the period under review were retrieved. The histologic diagnoses, sex, age and relevant histopathologic data were collated from these sources. Cases for which no definitive diagnosis was rendered or the tissue was autolysed were excluded from this study. The tumours were classified according to the 2012 WHO International Classification of breast tumours.[6] Malignant breast tumours were graded according to the Nottingham grading system.[7] Data were entered into a Microsoft Excel worksheet utilizing the 2013 Microsoft Excel software program (Microsoft Corporation, NY, USA) and analysed. Continuous variables were summarized using range and mean ± standard deviation, while categorical variables presented as frequencies were determined using descriptive statistics. Data were displayed using simple frequency tables while photomicrographs of representative lesions were included. The Research Ethics committee of our hospital granted ethical approval for this study.

Results
In the study period, 1081 patients had breast specimens taken, representing 8.6% of all the specimens (12501) processed in the department. Ninety-eight cases were excluded because the data was incomplete for diagnosis and/or the specimens were autolyzed. Of the 983 patients' whose specimens were included in this study, 954 were females (97%) and 29 (3%) were males, giving a female to male ratio of 32.9:1. The overall mean age of the patients' at presentation was 35.2 years (age range of 3-85 years), and the age distribution of the histologic categories of breast lesions is shown in table 1.

The lesions consisted of 31 (3.2%) non neoplastic breast lesions (NBLs), 590 (60.0%) benign neoplastic breast lesions (BNBLs) and 362 (36.8%) malignant breast lesions (MBLs), with a BNBLs to MBLs ratio of 1.6:1. The peak age incidence of the BNBLs was seen in the age 20-29 years age group, with mean age of 28.2 years and age range of 3-80 years. For the MBLs, the mean age at presentation was 45.9 years with age range of 22-85 years, and peak incidence seen in the 40-49 years age group. The histologic spectrum of NBLs, BNBLs, and MBLs, and the relative frequencies for each subtypes are shown in tables 2, 3 and 4 respectively. The most common BNBLs breast lesions seen during the study period was fibroadenoma (318/590, 53.9%), followed by fibrocystic change

Table 1: Age distribution of different categories of breast lesions

Age groups	Non neoplastic lesions	Benign lesions	Malignant lesions	Total *n* (%)
0-9	1	1	0	2 (0.2%)
10-19	5	130	0	135 (13.7%)
20-29	10	230	13	253 (25.7%)
30-39	12	126	106	244 (24.8%)
40-49	3	65	118	186 (18.9%)
50-59	0	21	75	96 (9.8%)
60-69	0	7	35	42 (4.3%)
70-79	0	7	10	17 (1.7%)
80-89	0	3	5	8 (0.8%)

Table 2: Histologic spectrum and frequency distribution of non-neoplastic breast lesions

Histological diagnoses	Frequency, n (%)
Inflammatory	
Chronic non-specific mastitis	19 (61.3%)
Chronic granulomatous mastitis	4 (12.9%)
Breast abscess	3 (9.7%)
Fat necrosis	3 (9.7%)
Others	
Pilar cyst	1 (3.2%)
Inclusion cyst	2 (6.5%)
Macromastia	1 (3.2%)
Galactocoele	1 (3.2%)
Total	31 (100%)

Table 3: Histologic spectrum and frequency distribution of benign neoplastic lesions

Histological categories and diagnoses	Frequency, n (%)
Non proliferative epithelial lesions	
Fibrocystic change	186 (31.5%)
Tubular adenoma	19 (3.2%)
Lactational adenoma	13 (2.2%)
Proliferative epithelial lesions without atypia	
Intraductal Papilloma	5 (0.8)
Sclerosing adenoma	13 (2.2%)
Duct ectasia	2 (0.3%)
Proliferative epithelial lesions with atypia	
Atypical ductal hyperplasia	4 (0.7%)
Fibroepithelial tumours	
Fibroadenoma	318 (53.9%)
Benign phyllodes tumours	10 (1.7%)
Mesenchymal tumours	
Lipoma	5 (0.8%)
Granular cell tumour	2 (0.3)
Tumour of the male breast	
Gynaecosmastia	11 (1.9%)
Miscellaneous	
Hidradenoma	2 (0.3%)
Total	590 (100%)

(186/590, 31.5%). The cancers were mostly carcinoma (98.3%) with invasive ductal carcinoma (300/362, 82.9%) being the most common followed by invasive medullary carcinoma (38/362, 10.5%). Representative photomicrographs of fibroadenoma and invasive ductal carcinoma are shown in figures 1 and 2 respectively.

Discussion
The hospital-based frequency of breast lesions over the 5-year period in our study was 8.6%. This frequency is similar to those reported in Makurdi (8.1%)[8] and Sokoto (7.1%)[9] but lower than reported figures in Uyo (16%)[10] and Abuja (13%).[11] Far

Table 4: Histologic spectrum and frequency distribution of malignant breast lesions

| Histological categories and diagnoses	Frequency, n (%)
Epithelial cancers	
Invasive ductal carcinoma	300 (82.9%)
Invasive medullary carcinoma	38 (10.5%)
Invasive lobular carcinoma	4 (1.1%)
Invasive papillary carcinoma	3 (0.8%)
Invasive mucinous carcinoma	1 (0.3%)
Invasive cribriform carcinoma	1 (0.3%)
Squamous cell carcinoma	1 (0.3%)
Ductal carcinoma-in situ	8 (2.2%)
Mesenchymal cancers	
Stromal sarcoma	2 (0.6%)
Malignant phyllodes tumour	2 (0.6%)
Lymphoid malignancy	
Hodgkin lymphoma	2 (0.6%)
Total	362 (100%)
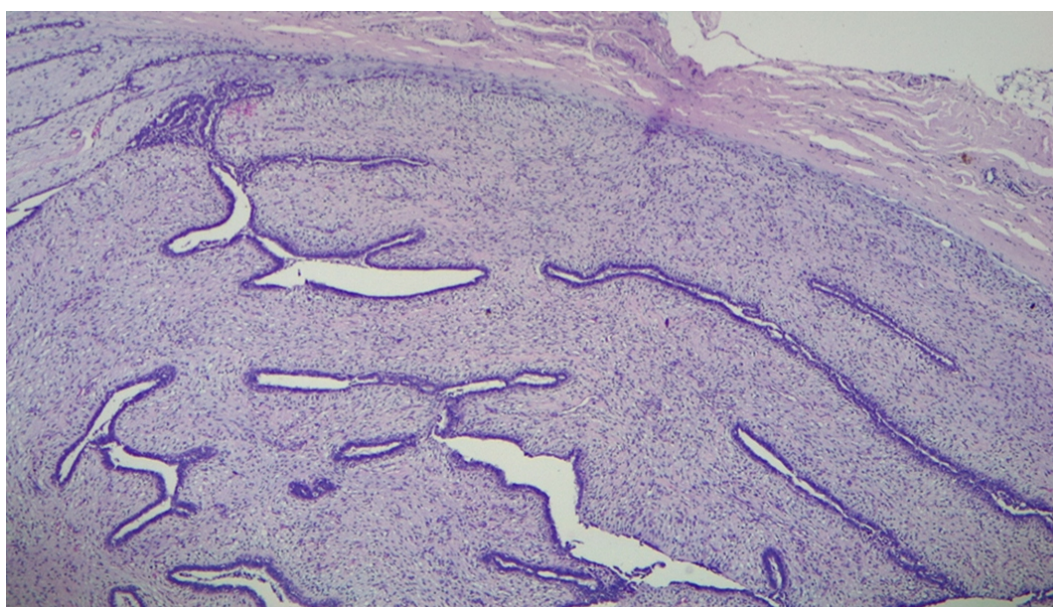
Figure 1: Fibroadenoma showing slit-like compression of most glandular spaces disposed within a fibromyxoid stroma, H&E x40.
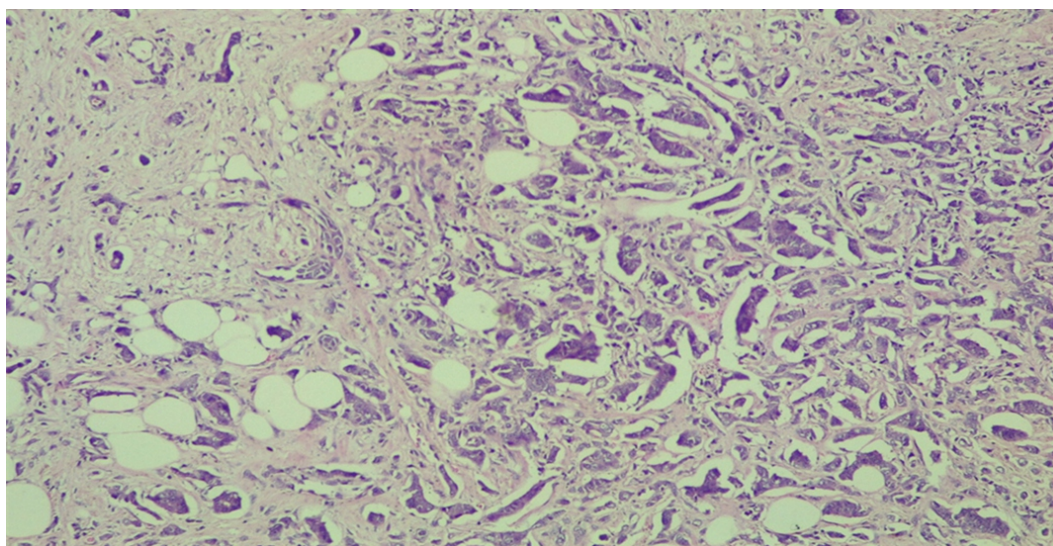
Figure 2: Invasive ductal carcinoma showing stromal invading nests, cords and strands of atypical ductal cells, H&E x40.

higher figures were reported from private laboratories by Nwafor et al (26%)[12] and Aligbe et al (22.35)[13] in Lagos and Benin City, Nigeria respectively. Although these figures show a relatively high burden of breast lesions in the different populations, the variations are influenced by the different total histopathology workload of the hospitals and laboratories referenced.

Like previously reported, breast diseases mostly affected females in the index work with a female to male ratio of 32.9:1. Consistent with the literature, benign neoplastic breast lesions (BNBLs) outstripped the malignant breast lesions (MBLs) in our study.[5,8-19] With a ratio of BNBLs to MBLs of 1.6:1, BNBLs constituted 60% of all the breast lesions in our review. This relative frequency is in the ballpark of the 66.1% reported by Ibrahim et al.[14] in Kano and the 65.1% recorded by Ezike et al.[11] in Abuja. Our proportion falls within the range of 48%-89.6% reported in Nigeria[5,8-17] and beyond.[18,19] That at least 6 out of every 10 patients presenting with breast lump at our facility will have a benign diagnosis provides an important local data to assuage patients during counselling to allow thorough investigation of their lumps. The mean age of patients with BBLs was 28.2 years and they occurred predominantly in the third decade of life (table 1). This age distribution is congruent with those reported across Nigeria.[5,8-17,20-24]

Fibroadenoma (figure 1) was the most common histologic variant of breast lesion (32.3%) and the most prevalent BNBLs (53.9%) in the index study in agreement with earlier data.[5,8-17,20-23] Fibroadenoma as biphasic tumours having stromal-epithelial components have been shown to only harbour potential for malignant progression if they have complex features like- epithelial calcifications, sclerosing adenosis, papillary apocrine change, or cysts larger than 0.3 cm.[1] we reported no case of complex fibroadenoma. Fibrocystic change representing the second most common BNBLs are mostly non-proliferative breast lesions. This pattern is congruent with other reports except that of Jeje et al[25] in a private practice Lagos.

The contribution of benign proliferative breast lesions to the development of malignant breast diseases in Nigeria has not been explored as possible contributor to the increasing incidence of breast cancer in our setting. These group of BNBLs have a 1.5% to 2% relative risk of transforming to invasive cancer relative to non-proliferative BNBLs. In this series (table 2), they made up of 4% of all BNBLs in consonance with the 2.3% to 3.3% reported in Ngeria.[5,11,20,23] In a mixed African and Caucasian population in Jamaica, the reported proportion of benign proliferative breast lesions was much higher (13.5%). Patients with such diagnoses should be educated on the implications and the

necessity for surveillance. Other BNBLs and non-neoplastic breast lesions were relatively rare (tables 1 and 2).

Malignant breast lesions accounted for 36.8% of all breast lesions during our review. The reported prevalence of MBLs in previous studies in Nigeria ranged from 21.3% to 44.3%.[5,8-17,24,25] It is to be noted that Irabor et al.[16] who studied breast lumps from one arm of their general surgery unit, documented a low proportion for breast cancer of 10.6%. The average age of our patients with cancer was 44.9 years with the peak seen in the 40-49 years age bracket. This age profile conforms to findings in other series from Nigeria,[5,10-16] Africa[27,28] and developing countries.[19,26,29-31] Isah et al.[9] in Sokoto reported that the preponderance of patients were in their 6th decade of life while Osime et al.[17] in Benin City and Eke etal.[8] in Makurdi documented that most cases of breast cancers affected women in their thirties. This pattern of affectation of young women in their productive years is in contrast to the situation in western countries where breast cancers are usually seen among menopausal females.[1,32,33] While it is unknown exactly why this is so, the role of aggressive genetic and biologic factors, poorly delineated changing carcinogenic environmental factors and shorter life expectancy among women in Africa have been advocated.[32,33] Our age distribution trend showed that no cancer was diagnosed before 20 years of age but the incidence rose steeply from 20 years to the peak in the 40-49 years and started declining at 50 years, with 65.5% of all the cancers occurring in women within the 20-49 years cohort (table 1). This profile supports the call to commence breast cancer screening at earlier than or at 40 years of age in our clime for those with high risk using locally optimized approaches in the absent of MRI as well as sustained breast cancer awareness campaigns.[5]

The histologic spectrum of breast cancer in our study is comparable to those previously described in Nigeria[5,10-16] and elsewhere.[19,26-33] The cancers were predominantly carcinoma (98.3%) with invasive ductal carcinoma being the prevalent subtype (82.9%). Varying proportions have been documented in African studies with a range of 59.2%–95.8%.[5,10-16,27,28] While different sample sizes, study designs and population may influence the proportions reported, there is no escaping the fact that the most aggressive histologic breast cancer subtype is most common among our patients who are usually poor and present late to hospitals. The less aggressive special breast cancer variants (invasive medullary and invasive lobular carcinoma) were distant second and third cancer types seen in our series. We also recorded rare types of breast cancers in form of metaplastic squamous cell carcinoma, stromal sarcoma and Hodgkin's lymphoma (table 4).

Conclusion

Breast lesions are common lesions among females in our setting. A significant proportion of these lesions are malignant and affects young females. The histologic spectrum, demographic and histopathology characteristics of breast lesion in our population are similar to previous reports in the country.

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Conflict of interest
Nil

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