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Neoplastic Breast Lesions in Females in an Adult Population in South-South Nigeria: A Ten-Year Review

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Abstract

Background: *Neoplastic breast lesions can be benign or cancerous. Particularly worrisome is the anxiety every breast lesion portends. Breast cancer presents a heavy burden on the health of the population especially among women. This study aims to study the different neoplastic breast specimen types collected in this adult population with emphasis on their biological behavior, cell type, grade and possible lymph node involvement.*

Methods: *This retrospective study analyzed breast lesion diagnoses from different specimen types, including lump excision, mastectomy, and trucut biopsy. All patient 20 years and above were included in this study done in River State Nigeria. Chi-square and Fisher's exact tests were used to assess statistical associations, with significance set at $p < 0.05$*

Results: *Invasive breast carcinoma was the most prevalent neoplastic lesion accounting for 41.6% of the diagnoses. Fibroadenoma followed in 37.7% of the patients. Majority (59.9%) of the cases were epithelial tumors, followed by mixed tumors with 38.5% and mesenchymal tumors with 1.5%. The mastectomy specimens were 179 cases with lymph node metastases seen in 55 of the cases. A significant association was found between diagnosis and age group ($\chi^2 = 45.53$, $p = 0.0345$), indicating that the distribution of breast lesions varies significantly with age.*

Conclusion: *This shows that epithelial breast cancers are the most common neoplastic lesions in females thus emphasizing the burden of breast cancer in our population. Very few cases of ductal carcinoma insitu coupled with the fact that many of the mastectomy specimens had lymph node involvement suggest that most patients in our environment present late with the disease. Increase in breast cancer awareness should be stepped up by the government with emphasis on self-breast examination and mammography to help early detection of breast cancer.*

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Introduction

The breast is a complex structure that originates from a modified sweat gland and includes both epithelial and connective tissue components [1]. It is one of the most frequent locations for neoplastic tumors in the human body [2]. These neoplastic growths can be benign or malignant (cancers). Breast cancer can also occur in men, but it is more than 100 times commoner in women [3,4].

Neoplastic breast lesions encompass a diverse range of diseases defined by the unregulated proliferation of mutated stem cells within breast tissue [2]. Neoplastic breast lesions can be malignant or benign. The identification and categorization of malignant breast lesions largely depends on the histomorphological characteristics of the tumor cells and associated tissues [5]. Breast cancer can arise from any cell within the mammary gland and displays a broad range of morphological characteristics, various immunohistochemical profiles, and distinct histopathological subtypes that have particular clinical trajectories and outcomes [2]. Histomorphological patterns denote the microscopic architecture and organization of cells and tissues, offering crucial insights regarding the tumor's characteristics, outlook, and potential treatment approaches [6,7].

Breast samples submitted for histology can be trucut biopsies, excision biopsies or mastectomy tissues. The trucut biopsy diagnoses range from insufficient tissues to frankly malignant tissues with specific histological subtypes [3]. Many studies suggests that the causes of breast lumps are fibrocystic changes, fibroadenomas, and breast carcinoma, in that order of prevalence. This suggests that most breast lesions are non-cancerous [8-12].

According to reports from the Global Cancer Incidence, Mortality, and Prevalence (GLOBOCAN), breast cancer is the most common cancer among women, with an estimated 1.67 million new cases diagnosed in 2012 [13]. There is a growing awareness of breast cancer among women, and many tend to associate breast symptoms with cancer, which can lead to increased anxiety levels [14].

The aim of this study is to offer a comprehensive overview of the histomorphological patterns of neoplastic breast lesions in adults with respect to different age groups of patients with neoplastic breast lesions. Analysis of the different types of surgical tissues and patterns of histological diagnoses with their biological behavior and cell types, as well as special types of breast cancers with the Scarff-Bloom-Richardson (SBR) grading, lymph node involvement in mastectomy specimens, and the correlation of histological diagnoses with the age of the patient and the type of surgical samples was done.

Materials and Methods

This is a retrospective study carried out using 969 female adults breast specimens that were histologically diagnosed in the Anatomical Pathology Department of the University of Port Harcourt Teaching Hospital and some other peripheral private pathology laboratories in Port Harcourt over a 10 years period from 2013 to 2022. The adult age adopted in this study was 20 years and above. The specimens submitted included trucut biopsies, mastectomy tissues, and lumps. The clinical and demographic data were extracted from the departmental registers, patient request forms, and duplicate copies of histology reports of all cases. The data extracted include age, sex, type of biopsy performed, histology diagnosis, cell type, behavior of the specimen, and other necessary information retrieved from departmental archives and generated test results. Data were analyzed using predictive analytical software (SPSS). Simple frequencies were determined for categorical variables, and the mean was evaluated for continuous data. Ethical approval was obtained from the Ethical Committee of the University of Port Harcourt Teaching Hospital to carry out this study.

Result

A total of 959 female breast specimens that were neoplastic were received within the study period

The age range considered for this presentation was between 20 to 85 years as shown in (Figure 1).

In the figure below, the age range of 20-25 years had the highest frequency of about 185 females, closely followed by age range 30-35 and 35-40 years with about 130 persons in each age range. The smallest age range who presented was patients between 80-85 years with frequency lower than 10.

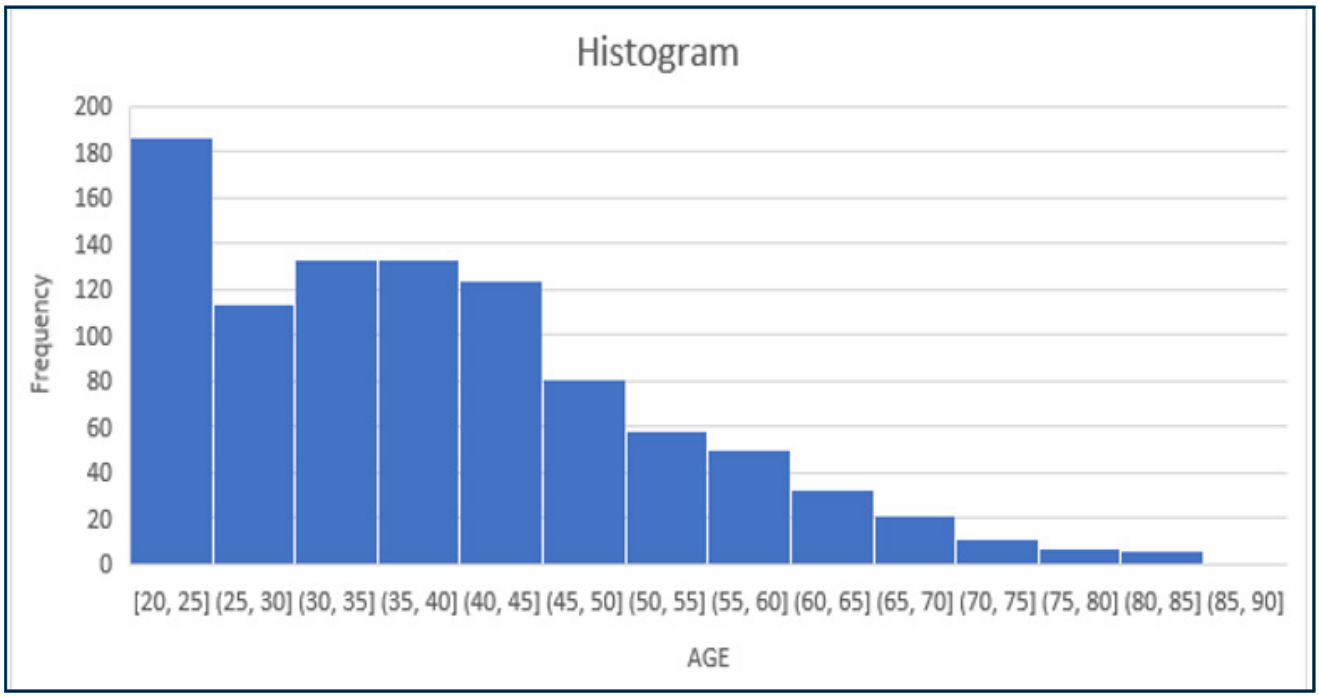

Figure 1: Age Distribution of Study Population

From Table 1, it shows that the average age of the population of the patients was 39 years, with a highest number of the patients being 20 years old. The youngest female adult patient examined was 20 years and the oldest was 86 years.

Table 1: Age Distribution in the Study Population

AGE	
N	959
Mean	39.11
Std. Error of Mean	0.452
Median	37.00
Mode	20.00
Std. Deviation	14.00
Range	66.00
Minimum	20.00
Maximum	86.00

The highest number of samples received during the study period was collected in 2020, a total of 130 samples, and the lowest was in 2014 which was 63 samples as seen in Figure 2 below.

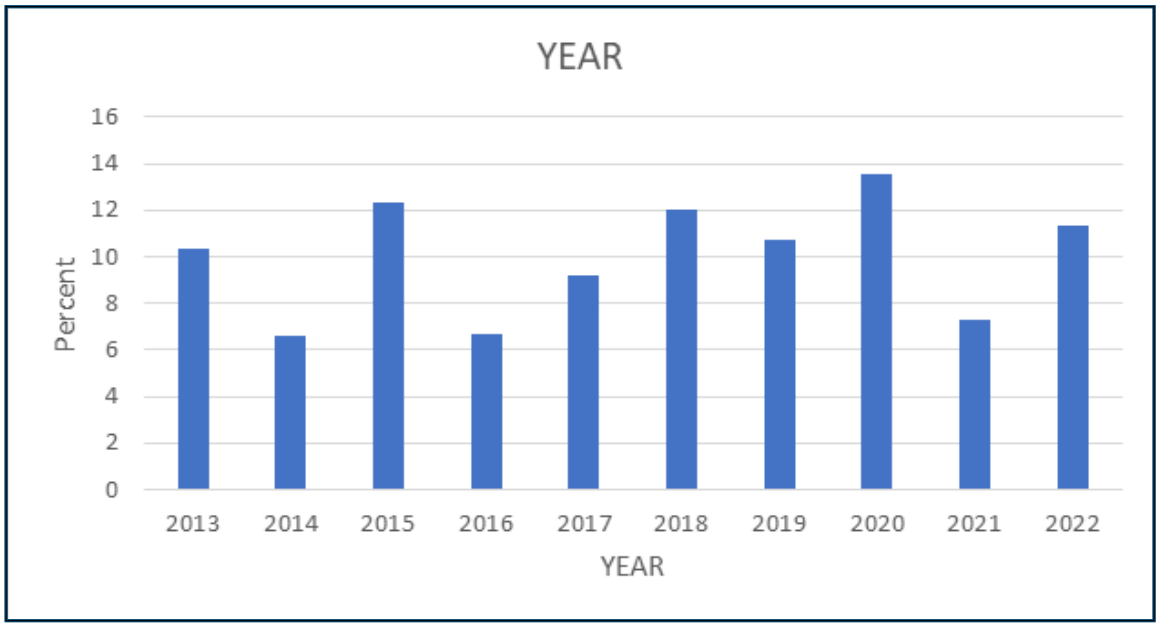

Figure 2: Bar Chart showing Number of Samples Received Per Year in the 10-Year Review Period

The sample population was analyzed in the 10-year age grouping and 28.9% of the study population, which is the majority, fell between the ages 20-29 years while age bracket 80-89 years was the lowest with a percentage of 1.3% as seen in the Table 2.

Table 2: Number of Samples Received By 10-Year Age Group

Age (years)	Frequency	Percent
20-29	277	28.9
30-39	257	26.8
40-49	216	22.5
50-59	119	12.4
60-69	58	6.0
70-79	20	2.1
80-89	12	1.3
Total	959	100.0

Trucut biopsy specimens, lumps and mastectomy specimens are the three types of breast specimen received for histology. Patients that had lumpectomy were 70% of the study population, 19% had mastectomy and 11% had a trucut biopsy which was the lowest (Figure 3).

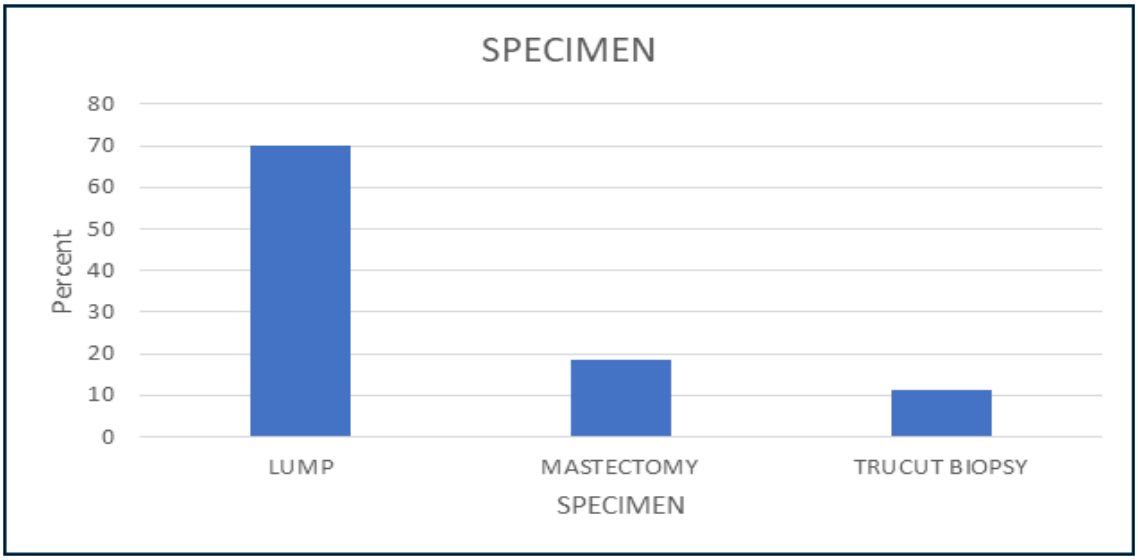

Figure 3: Bar Chart showing the types of Specimens

Invasive Breast Carcinoma (NST) (41.6%) has the highest occurrences with 400 samples out of 959 samples examined (figure 4) followed by fibroadenoma (37.7%) which had 362 samples diagnosed while neuroendocrine carcinoma, medullary carcinoma, fibroma and dermatofibroma all appeared once (0.1%).

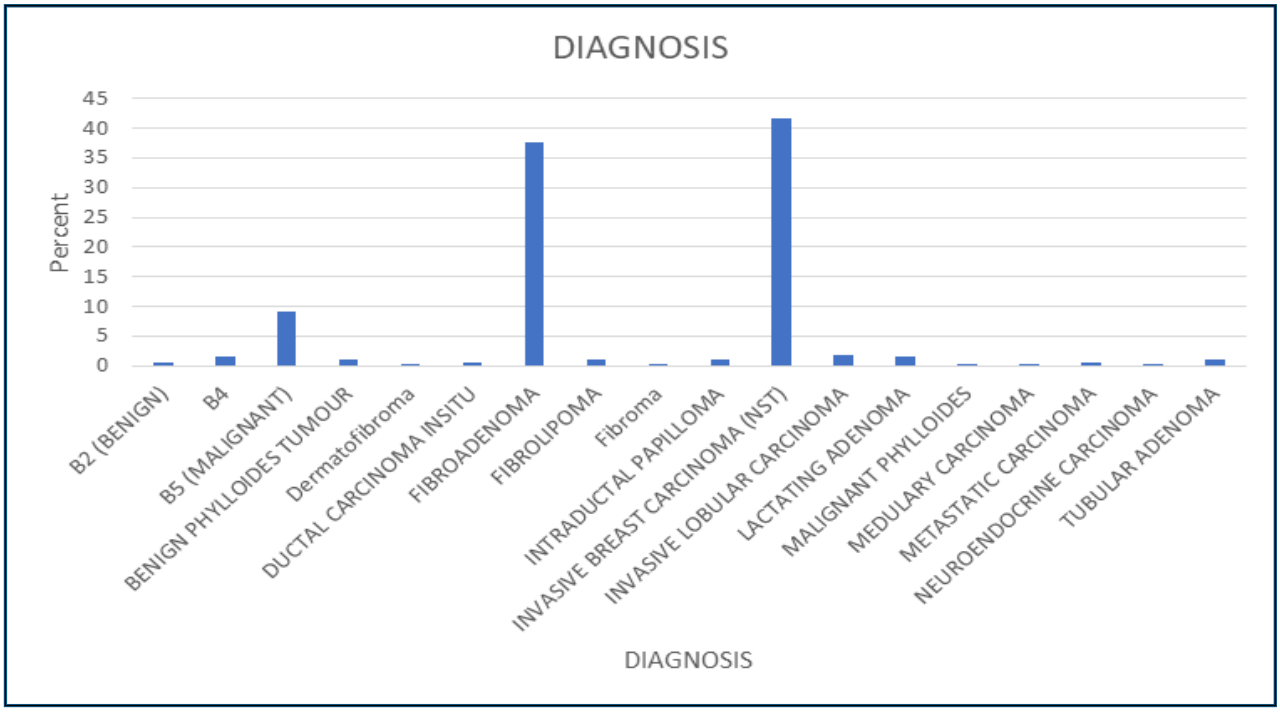

Figure 4: Bar Chart showing Histological Diagnoses of Female Breast Samples

Majority (59.9%) of the cases were epithelial tumors, followed by mixed tumors with 38.5% and mesenchymal tumors with 1.5% (Table 3). There was only one case of neuroendocrine tumor.

Table 3: Cell type

	Frequency	Percentage
EPITHELIAL	574	59.9
MESENCHYMAL	14	1.5
MIXED	370	38.5
NEUROENDOCRINE	1	0.1
Total	959	100.0

Table 4 shows that 53.9% of the study population had malignant diagnoses and 44.7% of cases were benign. However, 1.4% of cases fell into the category of B4 which are cases of trucut biopsies suspicious for malignancy.

Table 4: Biological Behavior

BEHAVIOUR	Frequency	Percentage
BENIGN	429	44.7
MALIGNANT	517	53.9
SUSPICIOUS	13	1.4
Total	959	100.0

Figure 5 shows that invasive breast carcinoma of no special type was the most common invasive breast carcinoma with 444 cases out of 485 cases while tubular carcinoma was the least recorded with only one case.

Table 5: Special Histological types of Invasive Breast Cancers

	Frequency	Percentage
APOCRINE CARCINOMA	4	0.8
MEDULLARY	6	1.2
MUCINOUS	17	3.5
NO SPECIAL TYPE	444	91.5
PAPILLARY	10	2.1
SECRETORY	3	0.6
TUBULAR	1	0.2
Total	485	100.0

The Scarff-Bloom-Richardson (SBR) grade of invasive breast carcinomas from grade 1 to grade 3 was done. A total of 475 samples were used because medullary, secretory and tubular carcinomas are not usually graded using SBR grading system. The grade 2 had the highest score of 374 and grade 1 had the lowest score of 38.

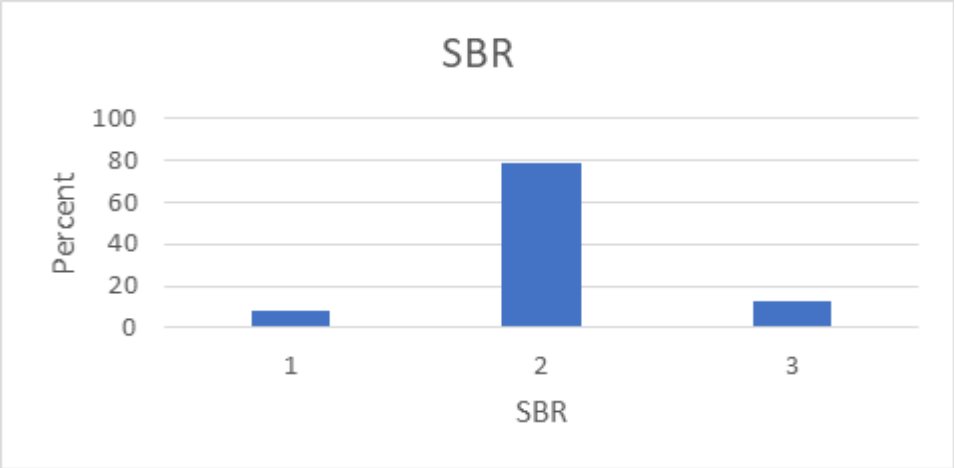

Figure 7: Bar Chart showing the SBR Grade of Neoplastic Lesions

The mastectomy specimens were 179 cases. Lymph node metastases were seen in 55 of the cases while 124 mastectomy specimens had no lymph node involvement.

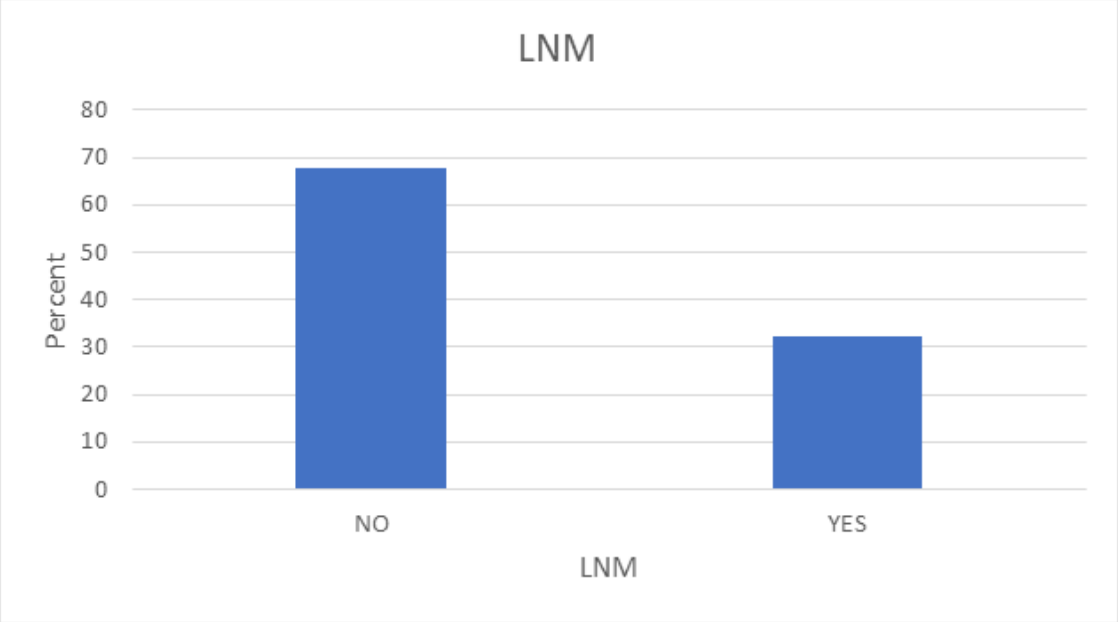

Figure 8: Bar Chart showing Lymph Node Metastases

Lumpectomy specimens were the highest number of tissues submitted for histological diagnosis with a total of 673 patients. Of these, fibroadenoma was the commonest diagnosis found in 360 patients. Mastectomy had a total of 179 and its commonest diagnosis was invasive Breast Carcinoma (NST) in 160 patients with the remaining showing no residual cancer cells seen. Trucut biopsy specimen had 107 patients and the commonest diagnosis was positive for malignancy (B5) in 88 patients.

Table 6: Diagnosis based on Specimen type (Lump, Mastectomy, Trucut)

Diagnoses	Specimen			Total
	Lump	Mastectomy	Trucut Biopsy	
Tubular Adenoma	9 (1.3)	1 (0.6)	0 (0.0)	10 (1.0)
Neuroendocrine Carcinoma	1 (0.1)	0 (0.0)	0 (0.0)	1 (0.1)
Metastatic Carcinoma	3 (0.4)	2 (1.1)	0 (0.0)	5 (0.5)
Medullary Carcinoma	0 (0.0)	1 (0.6)	0 (0.0)	1 (0.1)
Malignant Phyllodes	1 (0.1)	2 (1.1)	0 (0.0)	3 (0.3)
Lactating Adenoma	14 (2.1)	0 (0.0)	0 (0.0)	14 (1.5)
Invasive Lobular Carcinoma	10 (1.5)	6 (3.4)	0 (0.0)	16 1.7)
Invasive Breast Carcinoma (NST)	240 (35.7)	160 (89.4)	0 (0.0)	400 (41.7)
Intraductal Papilloma	11 (1.6)	0 (0.0)	0 (0.0)	11 (1.1)
Fibroma	1 (0.1)	0 (0.0)	0 (0.0)	1 (0.1)
Fibrolipoma	10 (1.5)	0 (0.0)	0 (0.0)	10 (1.0)
Fibroadenoma	360 (53.5)	2 (1.1)	0 (0.0)	362 (37.7)
Ductal Carcinoma Insitu	5 (0.7)	0 (0.0)	0 (0.0)	5 (0.5)
Dermatofibroma	1 (0.1)	0 (0.0)	0 (0.0)	1(0.1)
Benign Phylloides Tumour	5 (0.7)	5 (2.8)	0 (0.0)	10 (1.0)
B5 (Malignant)	0 (0.0)	0 (0.0)	88 (82.2)	88 (9.2)
B4	2 (0.3)	0 (0.0)	13 (12.1)	15 (1.6)
B2 (Benign)	0 (0.0)	0 (0.0)	6 (5.6)	6 (0.6)
Total	673 (100.0)	179 (100.0)	109 (100.0)	959 (100.0)

Invasive breast carcinoma of no special type was seen in 400 cases, compromising of both mastectomy and lumpectomy and also in 8 cases of trucut biopsies giving a total of 488. This makes it the commonest neoplastic breast lesion. Patients between 40-59 years had the highest frequency with 206 patients who had lumpectomies and mastectomies while 40 were diagnosed on trucut biopsies (Table 7). Fibroadenoma was seen in 362 patients with 83.7% of these patients being less than 39 years.

Table 7: Diagnosis based on Age Groups

	20 Year Age Categories				Total
	20-39 Years	40-59 Years	60-79 Years	>= 80 Years	
Tubular Adenoma	8 (1.5)	2 (0.6)	0 (0.0)	0 (0.0)	10 (1.0)
Neuroendocrine Carcinoma	0 (0.0)	1 (0.3)	0 (0.0)	0 (0.0)	1 (0.1)
Metastatic Carcinoma	4 (0.7)	1 (0.3)	0 (0.0)	0 (0.0)	5 (0.5)
Medullary Carcinoma	1 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.1)
Malignant Phyllodes	3 (0.6)	0 (0.0)	0 (0.0)	0 (0.0)	3 (0.3)
Lactating Adenoma	12 (2.2)	1 (0.3)	0 (0.0)	1 (8.3)	14 (1.5)
Invasive Lobular Carcinoma	6 (1.1)	6 (1.8)	4 (5.1)	0 (0.0)	16 (1.7)
Invasive Breast Carcinoma (NST)	139 (26.0)	206 (61.5)	46 (59.0)	9 (75.0)	400 (41.7)
Intraductal Papilloma	7 (1.3)	3 (0.9)	1 (1.3)	0 (0.0)	11 (1.1)
Fibroma	1 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.1)
Fibrolipoma	5 (0.9)	3 (0.9)	2 (2.6)	0 (0.0)	10 (1.0)
Fibroadenoma	303 (56.7)	53 (15.8)	6 (7.7)	0 (0.0)	362 (37.7)
Ductal Carcinoma Insitu	2 (0.4)	3 (0.9)	0 (0.0)	0 (0.0)	5 (0.5)
Dermatofibroma	1 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.1)
Benign Phyllodes Tumour	3 (0.6)	5 (1.5)	2 (2.6)	0 (0.0)	10 (1.0)
B5 (Malignant)	32 (6.0)	40 (11.9)	14 (17.9)	2 (16.7)	88 (9.2)
B4	6 (1.1)	7 (2.1)	2 (2.6)	0 (0.0)	13 (1.6)
B2 (Benign)	1 (0.2)	4 (1.2)	1 (1.3)	0 (0.0)	6 (0.6)
Total	534 (100.0	335 (100.0)	78 (100.0)	12 (100.0)	959 (100.0)

Discussion

Invasive breast carcinoma of no special type (NST) was the most common diagnosis, accounting for 41.6% of all cases, followed by fibroadenoma (37.7%). Notably, the incidence of invasive breast carcinoma (NST) increased with age, peaking in the 40-59 years age group. Similar to our study, an Indian study noted that 41.9%% of all breast lesions were diagnosed as invasive breast carcinoma of no special type [15]. A previous study conducted by Adebamowo et al. (2000) in Nigeria discovered that invasive breast carcinoma of no special type accounted for over 53% of all breast tumours while fibroadenoma on the other hand accounted for 24.5% [16].

The study analyzed the cell type distribution, revealing that epithelial lesions were the most common (59.9%) of all the neoplastic lesions which is similar to the findings in other studies [17,18]. Mixed tumours accounted for 38.5%, while purely mesenchymal tumours accounted for 1.5%. This finding is similar to a previous study [18,19]. Neuroendocrine tumours were among the least common (0.1%) in our study similar to the findings of Collado-Mesa et al that noted that neuroendocrine tumours are very rare breast tumours accounting for less than 1% of breast tumours [20].

The study found that 55 out of 171 mastectomy samples (32.2%) had lymph node metastases. This highlights the importance of proper sampling for lymph nodes in mastectomy samples because of its importance in cancer staging and prognosis. According to the American Cancer Society, all lymph nodes palpated must be submitted for histological evaluation [14]. By acting as filters, lymph nodes capture cancer cells that detach from the primary tumor, aiding in the assessment of cancer spread to other body parts [21]. This evaluation is pivotal in determining the extent of cancer progression, ultimately influencing treatment choices.

The study examined the Scarff-Bloom-Richardson (SBR) grade distribution, with Grade 2 being the most common (41.6%). Grade 1 accounted for 8%, whereas Grade 3 accounted for 50.3%. Scarff-Bloom-Richardson (SBR) grading is important for prognosis and represents minor prognostic factor.

The study examined three types of specimens: lump, mastectomy, and trucut biopsy. Lump specimens accounted for 70.2% of all samples, with Invasive Breast Carcinoma (NST) being the most common diagnosis (35.7%). Mastectomy specimens had a higher proportion of Invasive Breast Carcinoma (NST) diagnoses (89.4%) similar to the findings in other studies [23,24]. It is important to note that the finding of no residual tumour in a mastectomy sample that is thoroughly sampled in a patient with a previous diagnosis of breast cancer (from a lumpectomy or tru cut biopsy) does not suggest cure since it is well established that cancer is a systemic disease. The patient should be strongly advised to carry on with the treatment modalities offered by the clinician/oncologist.

Similar to other studies, the tru cut biopsy specimens in this study had a higher proportion (82.2%) of malignancy (B5) diagnoses [23,24]. A thorough patient clerking, examination and radiological evaluation helps to reduce the incidence of negative tru cut biopsies. It is also important to note that the expertise of the clinician is important for proper sampling in tru cut biopsies.

Conclusion

This study offers provides an understanding of the demographic and clinical profiles of patients with neoplastic breast lesions, emphasizing with real-life figures the critical role of early detection and diagnosis, especially among younger women. Invasive breast cancer of no special type is the commonest neoplastic breast lesion emphasizing the burden of breast cancer in our population. Very few cases of ductal carcinoma insitu coupled with the fact that many of the mastectomy specimens had lymph node involvement suggest that most patients in our environment present late with the disease. Self-breast examination and mammography should be massively encouraged to encourage early detection of breast cancer.

Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

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