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Ten-Year Histopathological Spectrum of Malignant Breast Lesions in a North-Central Nigerian Tertiary Centre

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ABSTRACT

Breast cancer remains a leading cause of morbidity and mortality globally, with low- and middle-income countries, including Nigeria, experiencing a growing burden. Histopathological evaluation is crucial for accurate diagnosis, subtype classification, and guiding treatment decisions. To evaluate the histopathological patterns, age and sex distribution, and frequency of malignant breast lesions diagnosed over 10 years at the Federal Medical Centre, Makurdi, North Central Nigeria. A retrospective descriptive study of all breast specimens received at the histopathology department between January 1, 2015, and December 31, 2024. Data on age, sex, and histological diagnosis were extracted, analysed, and presented as frequencies, percentages, and mean values. Out of 3,966 histopathological specimens received, 392 (9.9%) were breast lesions. Of these, 182 (46%) were malignant and 210 (54%) benign, giving a benign-to-malignant ratio of approximately 2:1. Malignant lesions predominantly affected females (96.2%, 175 cases), with a male-to-female ratio of 1:25. Invasive ductal carcinoma (IDC) was the most common subtype, accounting for 90% (165 cases), with a mean patient age of 49.2 years. The overall mean age for malignant breast disease was approximately 45 years. The most affected age groups were 41–50 and 51–60 years. Less common subtypes included papillary carcinoma (3.2%), ductal carcinoma in situ (1.6%), clear cell carcinoma (1.1%), and others.

Male breast cancer accounted for 3.8% of malignant cases, with an average age of occurrence of 60 years. Malignant breast lesions in Makurdi are predominantly invasive ductal carcinomas, affecting mainly middle-aged women. The findings reflect regional trends across Nigeria and sub-Saharan Africa. Early detection, improved diagnostic infrastructure, and targeted awareness, especially for male breast cancer, are recommended to improve outcomes.

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Introduction

Breast cancer represents the most commonly diagnosed malignancy and is the primary cause of cancer-related mortality in women globally, with an estimated 2.3 million new cases and 685,000 deaths each year{1}. Incidence rates are highest in high-income countries; however, mortality is disproportionately higher in low- and middle-income countries (LMICs) due to limited screening, late presentation, and insufficient treatment infrastructure {2}. In Sub-Saharan Africa, breast cancer occurs at a younger age, exhibits more aggressive histological subtypes, and is often diagnosed at advanced stages {3-5}. Nigeria exemplifies this regional trend, with breast cancer surpassing cervical cancer as the predominant malignancy among women, thereby significantly impacting the national cancer burden {6-8}.

Histopathological assessment is the definitive standard for diagnosis, classification, and treatment guidance of breast malignancies. Invasive ductal carcinoma (IDC) constitutes 70–80% of breast cancer cases worldwide, whereas invasive lobular carcinoma (ILC), mucinous, and medullary subtypes are less prevalent {9-10}. Research conducted in Sub-Saharan Africa, particularly in Ghana, Uganda, and Ethiopia, indicates a prevalence of IDC, frequently characterised as high-grade and oestrogen receptor-negative. Nigerian studies conducted in Lagos, Enugu, and Kano indicate that IDC is the predominant histological subtype, primarily observed in women aged 40–49 years, characterised by high-grade features and a notable incidence of lymphovascular invasion {6,8,11-13}. Despite these insights, regional disparities continue to exist, and data from North-Central Nigeria are still limited. Analysing the histopathological features of breast malignancies in this region is essential for enhancing local cancer control strategies, increasing diagnostic accuracy, and optimising resource distribution. This study presents a detailed histopathological analysis of malignant breast lesions identified at a Federal Medical Centre in North-Central Nigeria over a decade.

Materials and Methods

This study was a retrospective descriptive analysis carried out in the Department of Histopathology at the Federal Medical Centre in Makurdi, North-Central Nigeria. This study analysed all histologically confirmed malignant breast lesions collected in the laboratory over 10 years, from January 1, 2015, to December 31, 2024. All breast tissue specimens identified as malignant through histopathological evaluation during the study period were included, irrespective of patient age or gender. Cases lacking complete data, definitive histological diagnoses, or absent tissue blocks and slides were excluded from the analysis. Histopathology request forms, paraffin-embedded tissue blocks, and associated slides were obtained from departmental archives. Clinical details, including age, sex, tumour laterality, and provisional diagnosis, were extracted. All haematoxylin and eosin (H&E) stained slides were independently reviewed by a minimum of two pathologists to confirm the initial diagnoses. Additional slides were recut from formalin-fixed, paraffin-embedded (FFPE) tissue blocks for reassessment as needed. Data were input into Microsoft Excel and analysed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Results were presented through descriptive statistics, encompassing frequencies, percentages, and means, along with the use of simple charts and tables. Histologic subtypes were analysed based on age group and sex.

Results

A total of 3,966 histopathological specimens were received between January 1, 2015, and December 31, 2024, of which 392 (9.9%) were breast lesions. Among these, 182 cases (46%) were histologically diagnosed as malignant and 210 (54%) as benign, yielding a Malignant-to-Benign ratio of 1:2. Malignant breast lesions predominantly affected females (175 cases), with only 7 cases occurring in males, giving a male-to-female ratio of 1:25.(Figure 1)

The histopathological classification of malignant breast diseases showed a marked predominance of Invasive Ductal Carcinoma (IDC), accounting for 90% (165 cases), with a mean age of all patients with Invasive Ductal Carcinoma is approximately49.2 years.Papillary carcinoma comprised 3.2% (5 cases), while Ductal Carcinoma In-Situ represented 1.6% (3 cases). Other less common subtypes included clear cell carcinoma and invasive lobular carcinoma, each contributing 1.1% (2 cases). Mucinous carcinoma, malignant epithelial tumours, tubular carcinoma, and Hodgkin's lymphoma were each observed in 0.5% (1 case) of the total (Figure 2 and Table 1).

The age distribution of malignant breast diseases revealed that the majority of cases occurred in the 41–50 and 51–60-year age groups, with a mean age of all patients with malignant breast lesions is approximately 45years. Notably, two cases were identified in the paediatric age group: one case of clear cell carcinoma and one case of tubular adenocarcinoma (Table 1).

The histopathological diagnosis and age of occurrence of malignant breast disease in males revealed that 57% (5of the cases) were invasive ductal carcinoma. The average age of occurrence for malignant breast disease in males was 60 years (Figure 3).

Table 1: Age Distribution of Malignant Breast Disease

Histopathological patterns	Age (in Group years)									Percentages%
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71+	Total	
Invasive ductal carcinoma	-	-	14	40	64	32	10	5	165	90%
Mucinous carcinoma					1				1	0.5%
Malignant epithelial tumour					1				1	0.5%
Clear cell carcinoma	1			1					2	1.1%
Tubular adenocarcinoma		1							1	0.5%
Ductal carcinoma insitu				2		1			3	1.6%
Hodgkin's lymphoma				1					1	0.5%
Papillary carcinoma					1	4			5	3.2%
Paget Diseases						1			1	0.5%
Invasive lobular carcinoma			1		1				2	1.1%
Total	1(0.5%)	1(0.5%)	15(8%)	44(24 %)	67(37%)	38(21%)	11(6%)	5(3%)	182	100%

Using Weighted Mean Age Calculation, the mean age of patients with:

- The mean age of all patients with malignant breast lesions is approximately 44.7 years.
- The mean age of all patients with Invasive ductal carcinoma is approximately 49.2 years.

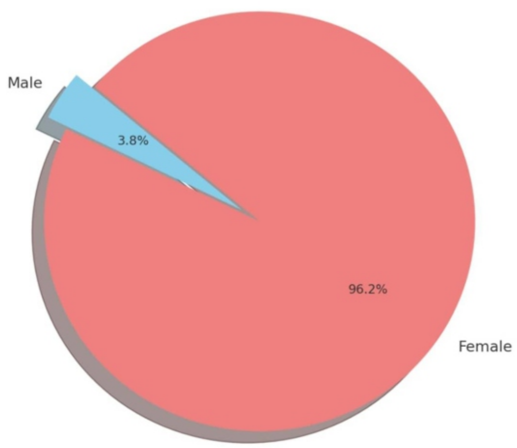

Figure 1: Malignant Breast Lesions: Sex Distributions

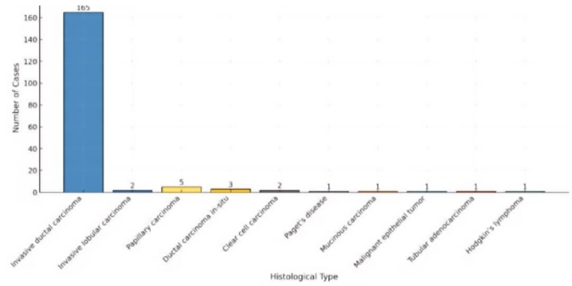

Figure 2: Malignant Breast Lesions: Histopathological Subtypes

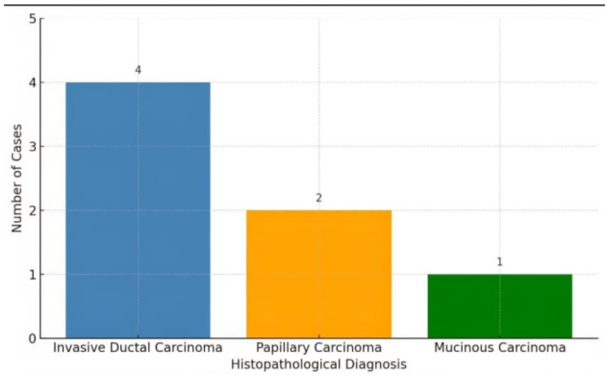

Figure 3: Male Malignant Breast Lesions: Histopathological Subtypes

Average age of occurrence of male breast cancers is 60 years.

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Discussion

Breast cancer remains a major public health concern globally and within sub-Saharan Africa (SSA), with rising incidence and disproportionate mortality in low- and middle-income countries (LMICs) due to late presentation, limited diagnostic infrastructure, and restricted access to optimal care{14,16}. The present study from the Federal Medical Centre (FMC), Makurdi, North Central Nigeria, spanning a decade (2015–2024), provides valuable insight into the histopathological profile, demographic patterns, and gender distribution of malignant breast lesions, contributing to the regional evidence base.

Of the 3,966 histopathological specimens reviewed, breast lesions comprised 9.9% (392 cases). Nearly half of these were malignant (182 cases, 46%), yielding a malignant-to-benign ratio of 1:2. This proportion is comparable to other Nigerian and SSA series, where malignancies constitute 40–55% of breast biopsies {17-19}. This high prevalence underscores the growing burden of breast malignancies in this population.

A striking female preponderance was observed: 175 females versus 7 males (M:F = 1:25), consistent with global gender patterns[20]. However, the 3.8% male breast cancer rate in this study is higher than the global average of <1%[21], indicating a potentially higher local incidence or increased detection. Male breast cancer in African populations, though underreported, is increasingly documented {22-24}, with similar findings in Jos and Ibadan reporting male proportions ranging from 2.5–5% {25,26}.

Invasive ductal carcinoma (IDC) overwhelmingly predominated, constituting 90% (165 cases) of all malignant breast lesions. This is in line with global statistics, where IDC accounts for 70–90% of invasive breast cancers {27-29}. Other subtypes, such as papillary carcinoma (3.2%), ductal carcinoma in situ (1.6%), invasive lobular carcinoma (1.1%), and mucinous carcinoma (0.5%), were infrequent. This histopathological profile mirrors other Nigerian and SSA studies from Lagos, Kano, and Accra, which also report a dominance of IDC and rare occurrence of lobular and mucinous subtypes {30-34}.

The rare detection of clear cell carcinoma, tubular carcinoma, and Hodgkin's lymphoma, each in isolated cases, reflects their global rarity and highlights the diagnostic diligence required for atypical lesions{35,36}. The identification of Hodgkin's lymphoma emphasises the need to consider secondary involvement of the breast by hematologic malignancies {37}.

The mean age of patients with all malignant lesions was approximately 44.7 years, while those with IDC had a slightly higher mean age of 49.2 years. The peak incidence was observed in the 41–50 and 51–60 age brackets, together accounting for 58% of cases. This pattern aligns with Nigerian and SSA data, where breast cancer tends to affect women a decade earlier than in high-income countries (HICs), where the median age of diagnosis is typically ≥60 years{38,39}.

This younger age distribution is attributed to a younger population structure, hormonal influences, and possible genetic/environmental factors in African populations {40}. Studies fromGhana, Cameroon, and Ethiopia similarly report peak incidence in the fourth and fifth decades{41-42-44}. The presence of malignant cases in paediatric age groups (clear cell and tubular carcinomas in two children) is rare but underscores the need for histopathological confirmation in all age groups.

Male breast cancer cases comprised 3.8% (7/182), with a mean age of 60 years, which is consistent with male breast cancer trends worldwide that typically present later than in females{45,46}.

IDC was again the predominant subtype (57%), followed by papillary and mucinous carcinoma. This aligns with literature from SSA, including studies in Senegal, Uganda, and Port Harcourt, which demonstrate IDC as the leading male subtype{47-50}.

The relatively older age of onset in males supports the global observation of delayed diagnosis in this group, often due to lack of awareness and sociocultural misconceptions{51}.

The findings from FMC Makurdi are consistent with broader SSA trends: a high proportion of invasive ductal carcinoma, a younger median age, and a low but present male breast cancer burden. In comparison to HICs, where early-stage diagnosis and molecular subtyping are routine, many SSA centres lack access to immunohistochemistry and advanced molecular diagnostics, limiting prognostic classification{52-54}.

Additionally, late presentation, limited access to radiologic and systemic therapies, and high treatment dropout rates compound the challenges in effective cancer control across SSA{55-57}.

Conclusion

This 10-year histopathological review highlights the dominance of invasive ductal carcinoma, the younger age profile of affected patients, and a low but notable frequency of male breast cancer. These findings affirm existing regional patterns and call for continued surveillance, improved diagnostic infrastructure, and public awareness.

Recommendations

Enhancing early detection through community-based awareness and screening initiatives, particularly for women aged 30 to 60 years, is essential. Improving diagnostic infrastructure by expanding access to immunohistochemistry and molecular testing will support accurate classification and treatment planning. Increased public and clinical awareness of male breast cancer is also needed to reduce diagnostic delays and stigma. Strengthening regional cancer registries will enable better data collection, surveillance, and health planning. Lastly, developing comprehensive oncology services with multidisciplinary care—including surgery, chemotherapy, radiotherapy, and psychosocial support—will improve patient outcomes across the region.

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Conflict of Interest: None.

Ethical Considerations: Approval for the study was obtained from the Health Research and Ethics Committee of the Federal Medical Centre, Makurdi. Patient confidentiality was maintained by anonymising all data during collection and analysis.

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