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Morphological Subtypes of Breast Cancer Among Women of Childbearing Age in Imo State, Nigeria

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A B S T R A C T

Inadequate diagnosis and prediction of tumour behaviours across institutions in Nigeria continues to result in diagnostic delay and impact on quality and reliability of pathology results. These are addressable gaps in pathology services. Breast cancer classification helps to provide accurate diagnosis of the disease and prediction of tumour behaviors to facilitate oncologic decision-making and treatment. The objective of this study was to determine the morphological subtypes of breast cancer occurring among women of childbearing age in Imo State, Nigeria. A retrospective descriptive study was conducted among breast cancer cases, aged between 16-49 years who were diagnosed at the Federal University Teaching Hospital, Owerri, Nigeria, from January 2018 to February 2022. A total of 263 female breast cancer cases met the inclusion criteria. The modal age range was 40-49 years old. The top occurring morphological subtype was Invasive ductal carcinoma with a score of 68.1%. Invasive ductal carcinoma is breast cancer pure form of its morphology. Next were invasive ductal malignant breast cancer B5b scoring 17.1% and invasive ductal mucinous type, 6.8%. Other variants include, mucinous adenocarcinoma, 2.3%, metastatic melanoma, 1.9%, invasive ductal metastatic adenocarcinoma, 0.8%, invasive papillary, 1.9% and invasive lobular, 1.1%. Invasive ductal carcinoma was by far the highest occurring morphologic subtype of breast cancer among women of child-bearing age. Morphological subtypes of breast cancer may not carry strong prognostic information based on the subtype alone, hence further molecular studies are recommended to inform precision medicine and enhance therapeutic outcome.

Introduction

Diagnosis and prediction of tumour behaviours across institutions in Nigeria continues to impact on quality and reliability of pathology results (Ntiamoah *et al.,* 2019). Pathology laboratories in Africa struggle to meet the growing needs of patients with cancer (Dafaallah and Awadelkarim, 2010). Breast cancer is a complex disease, a spectrum of many subtypes with distinct morphological features that lead to differences in natural history and response patterns to various treatment modalities (Yersal and Barutca, 2014). Cancer classification aims to provide accurate diagnosis of the disease and prediction of tumour behaviour to facilitate oncologic decision-making. Significant geographic variation in morphological patterns has been suggested in many studies (Sengal *et al.,* 2018).

The prognostic and therapeutic power of morphological subtypes is still not established and diagnostic guidelines are cautious regarding prognostic power based on the histological subtype alone. Therapy decisions are guided in most cases independently of the histological subtype and are directed by biomarkers and tumour stage (Sengal *et al.,* 2018). The morphology of a cancer refers to the histological classification of the cancer tissue (histopathological type) and a description of the course of development that a tumour is likely to take; benign or malignant (Metadata Online Registry, 2023).

There are limited studies on morphological subtypes of breast cancer among women of childbearing age. This study was designed to identify morphological subtypes of breast cancer occurring among women of childbearing age in Imo State, Nigeria and compared the results with other research from other countries around the world. Women of childbearing age in this study included women between the ages of 16-49 (WHO, 2021). The population allowed the study to focus on the experiences of women of childbearing age**.** The findings provide essential data and knowledge on the morphological distribution and inform plans for breast cancer management in the region.

Materials and Methods

This is a retrospective descriptive study carried out at the Federal University Teaching Hospital, Owerri (FUTH, Owerri) Nigeria, among women of child-bearing age diagnosed with breast cancer from January 2018 till February 2022. The Federal University Teaching Hospital, Owerri (FUTH, Owerri) serves as a referral centre for the secondary health care centres as well as the numerous primary health centres and health agencies across the 27 Local Government Areas of the state. It is a 650-bedded capacity tertiary health facility recognized for postgraduate training of doctors.

The institution from its inception enjoys enviable prominence, fame, and credibility in the provision of health care delivery services. Women within the age of 16-49 years who reported to the Federal Medical Centre Owerri, diagnosed tentatively with breast lesion, and had specimen sent to the pathology laboratory of the institution from January 2018 to February 2022 and with histology diagnosis of breast cancer, formed the inclusion criteria. Histology diagnoses of other breast lesions was excluded. All cases studied were diagnosed by tru-cut or excisional biopsy. Complete information about age and histological subtypes were obtained from the pathology department of the institution. The studied tissue biopsy specimens were embedded in paraffin and fixed in 10% formaldehyde, then cut. Standard histopathological analysis was done using usual hematoxylin and eosin (H&E) stains, highlighting the unique micro-architectural and morphological aspect of the tumour both in their pure and mixed forms, then were reported by a consultant pathologist and validated by a second pathologist in the same laboratory.

The analysis was done using IBM—SPSS (Statistical Package for the Social Sciences), version 20 computer software. Data were encoded into the software and scrutinized for incorrectly filled information and thereafter cleaned. Descriptive statistics of the variables were expressed using proportion (percent) and were presented in table as appropriate.

Results and Discussion

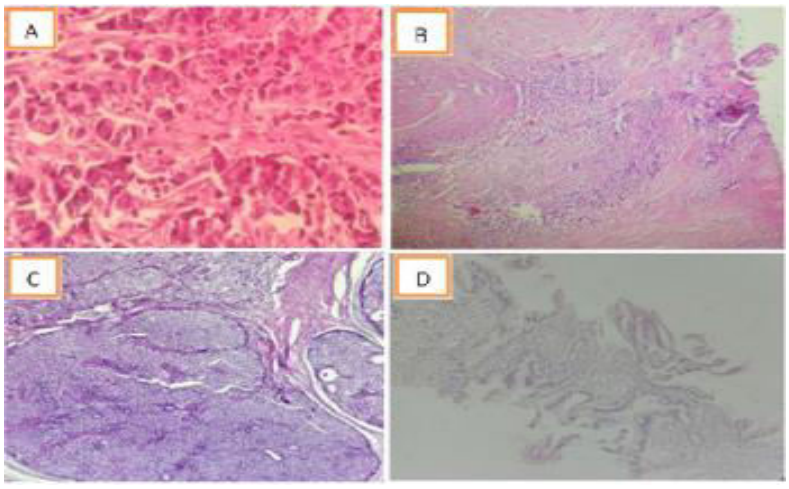
There were 263 cases of female breast cancer enrolled in this study. The age range of cases was 16-49 years old. The modal age range was 40-49 years. This consisted 39.2% of the study participants. The most frequent histological subtype was invasive ductal carcinoma with 68.1% of the cases showing the morphological variant in its pure form. Next in frequency were invasive ductal malignant breast cancer B5b, 17.1% and invasive ductal mucinous type, 6.8%. Other variants identified include mucinous adenocarcinoma, 2.3%, metastatic melanoma, 1.9%, invasive ductal metastatic adenocarcinoma, 0.8%, invasive papillary, 1.9% and invasive lobular, 1.1%.

Breast cancer is a complex disease with various subtypes that have different cellular structures and clinical manifestations (Yersal and Barutca, 2014). In addition, the prognosis and response to breast cancer treatment depend on multiple variables. In this study, morphological subtypes were determined among women of child-bearing age. The findings of this study is in keeping with that from a prospective study in Lagos State Nigeria where the most frequent histological type was found to be invasive ductal carcinoma 92.8% (Adeoluwa *et al.,* 2020). It equally agrees with the finding from a retrospective study in Kano State Nigeria where the most common histomorphologic type was invasive carcinoma (NST) accounting for 73.2% of cases (Asma'u *et al.,* 2019). These were followed in frequency by invasive lobular carcinoma accounting for 6.8% of cases and invasive papillary carcinoma representing 6.5% of cases, unlike what was found in the present study where invasive ductal B5b malignant and invasive ductal mucinous types were next in frequency, followed by mucinous adenocarcinoma, 2.3%. The finding of this study is further collaborated by the outcome of a retrospective study in the Central African Republic where the most common breast cancer morphology was reported to be invasive ductal carcinoma, 64.9% (Balekouzou *et al.,* 2016). Similarly, a retrospective cohort study in Saudi-Arabia found most cases (*n = 629*, 85%) to be ductal, a few of them (*n = 84*) 11.4% were lobular, while the rest of the cases were of other histological types that included medullary, tubular, mucinous, metaplastic, adenoid cystic, and encysted papillary carcinoma (Al-thoubaity, 2020).

Table.1 The morphological subtypes of breast cancer occurring among women of childbearing age in Imo State, Nigeria.

Morphological Subtypes	Frequency	Percent	Cumulative Percent
Invasive Ductal Ca (Mucinous)	18	6.8	6.8
Invasive Ductal Ca	179	68.1	74.9
Mucinous Adenocarcinoma	6	2.3	77.2
Metastatic Melanoma	5	1.9	79.1
Metastatic Adenocarcinoma (Invasive Ductal)	2	0.8	79.8
Invasive Papillary	5	1.9	81.7
B5b Malignant (Invasive Ductal)	45	17.1	98.9
Invasive lobular	3	1.1	100.0
Total	263	100.0	100.0

Figure.1 A. Invasive Ductal Carcinoma (400X) B. Invasive Lobular Carcinoma (40X) C. Solid Papillary Carcinoma (100X) D. Invasive Ductal Carcinoma with Mucinous Component (100X).



Clinical and histopathological predictors of breast cancer subtypes in Rwandan women was likewise studied, the authors argued that clinical and histopathological tumour characteristics can be used to predict breast cancer molecular subtypes with acceptable accuracy and found that majority, 95.8% had invasive ductal carcinoma (Ntirenganya *et al.,* 2022).

Invasive ductal carcinoma which was the most common histological subtype in this study agrees with prior studies in Turkey, 78.7% and the US 75% (Mohapatra and Satyanarayana, 2013; American Cancer Society, 2019-2020).

Because histological subtypes of breast cancer do not carry strong prognostic information based on the histological subtype alone. Translation of molecular approaches into daily clinical practice is recommended to support morphological features and immunohistochemistry profile.

The morphological subtypes of breast cancer found in this study include Invasive ductal carcinoma, which was by far the highest occurring, followed by invasive ductal malignant breast cancer B5b and invasive ductal ca. Other variants were mucinous adenocarcinoma, metastatic melanoma, invasive ductal metastatic adenocarcinoma, invasive papillary and invasive lobular.

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Authors' Contributions

A. M. G. Omeaku: Conceived and designed the study, collated data, managed the data analyses and presentation, managed the literature searches, and drafted the manuscript; E. T. Oparaocha: Supervised the study, significantly contributed to the study design, and revised the manuscript for important intellectual content; I. G. Nweke: Performed the histology diagnosis and collation of data; C. I. C. Ebirim: Partook in the data analyses of the study; J. Nwokorie: Performed the histology analysis and collation of data; U. M. Chuckuocha: Reviewed the manuscript and made input; N. E. Ahajumobi: Reviewed the manuscript and provided valuable feedback. All Authors read and approved the final manuscript.

Consent

Waiver of consent was obtained as the study involved a minimal risk retrospective chart review in which no patient interaction occurred.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical approval Ethical approval was sought from the Health Research Ethics Committee of Federal Teaching Hospital, Owerri, Imo State Nigeria and obtained, with approval number, 11237**.** This study was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki."

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

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