

## Breast Cancer Patterns and Surgical Oncology Practice in a Low-Income Setting of Sub-Saharan Africa

Ulrich Igor Mbessoh Kengne<sup>1\*</sup>, Jaafar Ibn Abou TalibThiam<sup>1</sup>, Mamadou Ndiaye<sup>1</sup>, Salif Balde<sup>1</sup>, Amacoumba Fall<sup>1</sup>, Esaie Kasokota<sup>1</sup>, Awa Niasse<sup>1</sup>, Mamadou Sow<sup>1</sup>, Mohammed Ezzet Charfi<sup>1</sup> and Sidy Ka<sup>1,2</sup>

<sup>1</sup>Oncology department of Dalal Jamm University Hospital, Dakar, Senegal.

<sup>2</sup>Department of Surgery and Specialties, Faculty of Medicine, Pharmacy and Odontostomatology, Cheikh Anta Diop University, Dakar, Senegal.

### \*Correspondence:

Ulrich Igor Mbessoh Kengne, Oncology department of Dalal Jamm University Hospital, Dakar, Senegal.

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### ABSTRACT

**Objective:** The purpose of the study was to highlight epidemiological and clinical specificities of BC in our setting as well as surgical management approaches.

**Methods:** A retrospective cross-sectional study was conducted in the surgical oncology unit of the Dalal Jamm University Hospital from January to July 2023. Dalal Jamm University Hospital is a teaching hospital based in Dakar, Senegal.

**Results:** The median age for BC was 45 years (37-54). The main histological types of BC were invasive ductal carcinoma (IDC) and invasive lobular carcinoma (ILC) with respectively 95.1% and 4.9% of cases. SBR grades 2 and 3 were more common with respectively 78% and 19.5% of cases. BC was locally advanced in 65.9% of cases and metastatic in 31.7% of cases. Modified radical mastectomy (MRM) was the main surgical management approach with 97.6% of cases followed by lumpectomy or breast-conserving surgery (BCS) with 2.4% of cases.

**Conclusion:** The mean age of BC in sub-Saharan African populations is relatively younger than European and American ones. Furthermore, women present with advanced stages of disease explaining higher rate of NAC in African setting than Europe and America. Finally, MRM is the most common surgical management procedure in sub-Saharan Africa whereas it is BCS (lumpectomy) in Europe and America.

### Keywords

Breast cancer, Africa, Specificities, Surgical management.

### Introduction

Female breast cancer (BC) is the most frequently diagnosed cancer and the leading cause of cancer mortality in women worldwide [1-3]. In 2020, over 2.3 million patients were newly diagnosed with BC and 685,000 death from breast cancer occurred in 2020 [1]. Breast cancer is recognized as an increasingly important burden of disease, particularly among women in African countries [4]. Among women from Sub-Saharan Africa however, it is second

most frequent after cervical cancer [5]. The management of breast cancer is multimodal and this could be very challenging to physicians in the developing countries [6]. The choice of therapy is more often than not dictated by the local availability of resources [6]. The role of surgery for the loco-regional clearance cannot be over-emphasized as it represents the most popular option when there is limited infrastructure and access to chemotherapy and radiotherapy [6]. This study aimed to highlight epidemiological and clinical specificities of BC in our setting as well as surgical management approaches.

## Materials and Methods

### Study Design

A retrospective cross-sectional study was conducted in the surgical oncology unit of the Dalal Jamm University Hospital from January to July 2023. Dalal Jamm University Hospital is a teaching hospital based in Dakar, Senegal. It is the greatest cancer care reference center in the country. The local institutional review board approved this retrospective study, which waived the requirement to obtain written informed consent from patients.

### Data Collection

All medical records of patients operated for breast cancer were selected from the archives. Records containing relevant variables for the study were included. Those variables were age, gender, histological type of BC, Scarf-Bloom-Richardson grade, stage and surgical management approach. Medical records missing at least one of these data were systematically excluded from the study. All relevant data were first reported on a questionnaire and then registered in statistical analysis software.

### Data Analysis

SPSS statistical software package version 25.0 (Statistical Package for Social Sciences) was used to carry out the statistical analysis of the data. Age of patients was described by median, interquartile range and age groups. Categorical variables were presented by effectives and percentages in frequency tables. Chi-square test was used to look for a potential relationship between the stages of BC and administration of a neoadjuvant chemotherapy as well as the surgical management approach. A p-value less than 0.05 was considered as statistically significant.

## Results

One hundred twenty three patients with BC were included in the study. All patients were females. The median age for BC was 45 years and 46.4% of females were under 45 years old (see Table 1).

**Table 1:** Age's statistics of patients.

Age statistics	N (%)
[20; 35]	21 (17.1)
[35; 45]	36 (29.3)
[45; 55]	36 (29.3)
[55; 65]	12 (9.8)
[65; 75]	18 (14.6)
Median	45
Interquartile range	37 - 54
Minimum	21
Maximum	74

The main histological types of BC were invasive ductal carcinoma (IDC) and invasive lobular carcinoma (ILC) with respectively 95.1% and 4.9% of cases. SBR grades 2 and 3 were more common with respectively 78% and 19.5% of cases. BC was locally advanced in 65.9% of cases and metastatic in 31.7% of cases (see Table 2).

**Table 2:** Histological patterns and stages of BC.

Neoplasms patterns	N (%)
<b>Histological types</b>	
Invasive ductal carcinoma	117 (95.1)
Invasive lobular carcinoma	36 (4.9)
<b>Scarf-Bloom-Richardson grade</b>	
Grade I	3 (2.5)
Grade II	96 (78)
Grade III	24 (19.5)
<b>Stages</b>	
Localized	3 (2.4)
Locally advanced	81 (65.9)
Metastatic	39 (31.7)

A neoadjuvant chemotherapy was administered in 80.5% of patients including 74.1% of locally advanced BC and all metastatic BC, whereas no localized BC received neoadjuvant chemotherapy ( $p < 0.001$ ). Modified radical mastectomy (MRM) was the main surgical management approach with 97.6% of cases followed by lumpectomy or breast-conserving surgery (BCS) with 2.4% of cases. MRM was more frequently performed in patients with locally advanced and metastatic BC while lumpectomy was more performed in patients with localized BC ( $p < 0.001$ ) ( see Table 3).

**Table 3:** Neoadjuvant chemotherapy and surgical approach according to BC stage.

BC Stage	Neoadjuvant chemotherapy		P value	Surgical management		P value
	Yes (%)	No (%)		MRM (%)	BCS (%)	
Localized	0	100		0	100	
Locally advanced	74.1	27.9	<0.001	100	0	<0.001
Metastatic	100	0		100	0	
Total	80.5	19.5		97.6	2.4	

## Discussion

This study has been conducted with the purpose of highlighting epidemiological and clinical specificities of BC in our setting as well as surgical management approaches. Articles published in Africa reveal that females are far more affected by BC than males [3-12]. In agreement with this strong evidence, all patients in this study was females. Note that in males, the breast is a rudimentary structure, relatively insensitive to endocrine influences. Various publications on the topic shows that black African populations present at a relatively younger age compared to white-skinned African populations. Indeed, the mean age of BC in black African populations range from 45 to 48 [4,6-9,11,13]; yet, in white-skinned populations, the mean age is around 52 years and tends to be similar to that of European natives [1,2,10,12,14]. This findings highlights an interracial difference in populations at risk for breast cancer. The two major histological types of BC in this study were IDC and ILC with respectively 93.2% and 4.5% of cases. These findings are concordant with those in several publications made in Africa [4-13]. Furthermore, grade 2 and grade 3 were

in majority regarding to the Scarf-Bloom-Richardson grade with 78% and 19.5% of cases respectively. Same findings have been reported in many studies [9,12,13]. Unlike Europe and America, women present with advanced stages of BC in Africa [1-3]. This observation is corroborated by this study as well as studies of Ranaivomanana et al. in Madagascar, Okifo et al. in Ghana, Deressa et al. in Ethiopia, Cubasch et al. in South Africa, Fitzpatrick et al. in Senegal and Olaogun et al. in Nigeria [3,4,6-8,14]. For Cubasch et al., reasons of this may be poorer patient awareness, lack of population screening programs, cultural barriers, and poor access to a sometimes dysfunctional health care system [3]. Furthermore, Clegg-Lamprey found that some were due to delays caused by previous medical consultations or ignorance or the painless nature of the lump and the fact that the patients thought the lump might disappear [4]. Additionally, Okifo et al. reported that women in Ghana are likely to resort to traditional or spiritual treatment methods, and when those methods fail, they turn to orthodox medical advice [4].

Unlike in Europe where Heinig et al. reported that the proportion of patients with neoadjuvant systemic therapy (NAC) were ranged 2–12% [2], in this study, a NAC was administered in 80.5% of patients including 74.1% of locally advanced BC and all metastatic BC, whereas no localized BC received neoadjuvant chemotherapy and there was a significant association between advanced stage of disease and administration of NAC ( $p < 0.001$ ). The same observation was made by Okifo et al. who showed that advanced stage 3 and 4 cancer patients were twofold more likely to receive neoadjuvant therapy than patients with earlier stage disease (OR= 2.0 95% CI (1.4, 3.0,  $p < 0.001$ ) [4]. Furthermore, O’Neil et al. reported that the decision to use neoadjuvant chemotherapy (NAC) is based on practical considerations [15]. It is indicated in patients with inoperable tumors, with the goal of reducing tumor volume to allow surgery, or for women with large resectable tumors who desire breast conserving surgery [15]. NAC use also offers prognostic information; complete pathologic tumor response is a strong predictor of improved overall survival, especially in patients with estrogen and progesterone receptor negative subtypes [15].

Most studies conducted in African setting revealed that MRM is the most common surgical procedure performed in patients with BC [3,6,8]. In this study, MRM was performed in the large majority (97.6%) of patients whereas BCS (lumpectomy) was performed in 2.4% of cases. Furthermore, Amouzou et al. reported in a meta-analysis of surgical procedures for female breast cancer in sub-Saharan Africa that the rate of MRM in all studies was superior to 60% [16]. This African observation is however antagonistic to the European one where Heinig et al. reported that BCS was the most common surgical procedure performed [2]. An explanation of this antagonism may be that comparatively to Africa, in Europe most patients present in early stages of BC due to many health access facilities like insurance coverage, efficient screening programs and effective health policies.

## Conclusion

The mean age of BC in sub-Saharan African populations is relatively younger than European and American ones. Furthermore, women present with advanced stages of disease explaining higher rate of NAC in African setting than Europe and America. Finally, MRM is the most common surgical management procedure in sub-Saharan Africa whereas it is BCS (lumpectomy) in Europe and America.

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